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ABSTRACT

This report presents the results of the statewide spring 2000 administration of the Colorado Student Assessment Program (CSAP). Third-grade students were assessed in Reading; fourth- and seventh-grade students were assessed in Reading and Writing; and eighth-grade students were assessed in Mathematics and Science. The assessments were developed by CTB/McGraw-Hill in association with the Colorado Department of Education and were scored, scaled, and analyzed by CTB/McGraw-Hill. This technical report contains information about the assessments themselves, the results, item analyses, scaling, and calibration. One appendix presents the frequency distribution of scale scores, and the other contains a differential item functioning analysis. (Contains 107 tables and 19 references.) (SLD)

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Colorado
Student Assessment Program

Technical Report
2000

Submitted to the

Colorado Department of Education

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The 2000 Colorado Student Assessment Program Technical Report

This report presents the results of the statewide Spring 2000 administration of the Colorado Student Assessment Program (CSAP). Third-grade students were assessed in Reading; fourth- and seventh-grade students were assessed in Reading and Writing; and eighth-grade students were assessed in Mathematics and Science. The assessments were developed by CTB/McGraw-Hill in concert with the Colorado Department of Education and were scored, scaled, and analyzed by CTB/McGraw-Hill.

Part 1: Overview of the CSAP Assessments

The assessment is intended to measure the Colorado Content Standards, as follow;

The Colorado Model Content Standards: Reading and Writing

1. Students read and understand a variety of materials. (Reading)
2. Students write and speak for a variety of purposes and audiences. (Writing)
3. Students write and speak using conventional grammar, usage, sentence structure, punctuation, capitalization, and spelling. (Writing)
4. Students apply thinking skills to their reading, writing, speaking, listening, and viewing. (Reading)
5. Students read to locate, select, and make use of relevant information from a variety of media, reference, and technological sources. (Reading)
6. Students read and recognize literature as a record of human experience. (Reading)

The Colorado Model Content Standards: Mathematics

1. Number Sense–Students develop number sense and use numbers and number relationships in problem-solving situations and communicate the reasoning used in solving these problems.
2. Patterns, Functions, and Algebra--Students use algebraic methods to explore, model, and describe patterns and functions involving numbers, shapes, data, and graphs in problem-solving situations and communicate the reasoning used in solving these problems.
3. Data Analysis, Probability, and Statistics–Students use data collection and analysis, statistics, and probability in problem-solving situations and communicate the reasoning used in solving these problems.
4. Geometric Concepts--Students use geometric concepts, properties, and relationships in problem-solving situations and communicate the reasoning used in solving these problems.
5. Measurement--Students use a variety of tools and techniques to measure, apply the results in problem-solving situations, and communicate the reasoning used in solving these problems.
6. Operation and Calculation--Students link concepts and procedures as they develop and use computational techniques including estimation, mental arithmetic, paper-and-pencil, calculators, and computers in problem-solving situations, and communicate the reasoning used in solving these problems.

The Colorado Model Content Standards: Science

1. Scientific Investigation–Students understand the processes of scientific investigation and design, conduct, communicate about, and evaluate such investigations.
2. Physical Science--Students know and understand common properties, forms, and changes in matter and energy.

3. Life Science–Students know and understand the characteristics and structure of living things, the processes of life, and how living things interact with each other and their environment.
4. Earth and Space Science–Students know and understand the processes and interactions of Earth's systems and the structure and dynamics of Earth and other objects in space.
5. Interrelationships--Students know and understand interrelationships among science, technology, and human activity and how they can affect the world.
6. Connections--Students understand that science involves a particular way of knowing and understand common connections among scientific disciplines.

Test Development and Content Validity

In order to assure the content validity of the CSAP assessments, the Colorado Model Content Standards were studied by CTB's Content Developers. To develop the 2000 Colorado Student Assessment Program, Colorado content area specialists, language arts teachers, and assessment experts worked with CTB/McGraw-Hill to select a pool of items that measured Colorado's Model Content Standards. These items were derived from CTB/McGraw-Hill's extensive pool of previously field-tested reading passages, writing prompts, mathematics, and science items, as well as from other sources. Many existing items were revised in order to ensure better measurement of the relevant Colorado standard and benchmark. Additional items were developed as needed to better align the pool to the Model Content Standards. These items were carefully reviewed and discussed by Content Review, Bias Review, Community Sensitivity Review, and Instructional Impact committees to assure not only content validity, but also the quality and appropriateness of the items. These committees represented Colorado's diverse population and were composed of Colorado teachers, community members, State Department of Education staff, and SADI Council members. The committees' recommendations were used to form the pool of items from which the final reading and writing assessments were constructed.

A subset of the items used in the 1999 forms of the third, fourth, and seventh grade Reading and Writing assessments were also included in the 2000 forms in order to equate the forms across years. This was necessary in order to provide results that can be defensibly compared from year to year. The eighth grade Colorado students were assessed for the first time in Mathematics and Science.

Test Configuration

Tables 1 and 2 indicate the configuration of the Reading, Writing, Mathematics, and Science assessments by grade, content area, item format, and standard coverage.

Third Grade Reading

The 2000 CSAP third grade Reading assessment consisted of a single form of 41 items, 32 multiple-choice (MC) and nine constructed-response (CR), with a total of 53 points. A student thus can score a maximum of 53 points in the Reading test. All MC items have one level. The nine CR items included seven 2-point, one 3-point, and one 4-point with a total of 21 points. The assessment comprised only one standard.

Fourth Grade

The 2000 CSAP fourth grade assessment consisted of a single form for Reading and Writing. Sessions 1, 2, and 5 of the form assessed Writing; and 3, 4, and 6 assessed Reading ability of students.

Reading

The 2000 CSAP fourth grade Reading test consisted of 70 items, 53 MC and 17 CR, with a total of 91 points. A student thus can score a maximum of 91

points in the Reading test. All MC items have one level. The 17 CR items included two 1-point, 11 2-point, two 3-point, and two 4-point, with a total of 38 points.

The fourth grade Reading test measured four standards. Standard 1 was measured by 24 MC and three CR items with a total of 28 points. Similarly, 14 MC and four CR items, with a total of 22 points, measured standard 4; 12 MC and three CR items, with a total of 20 points, measured standard 5; and three MC and seven CR items, with a total of 21 points, measured standard 6.

Table 1. Configuration of 2000 CSAP Assessments

Grade	Content Area	Maximum Possible Points	Total # of Items		Frequency of CR Items with the Given Number of Maximum Points			
			MC	CR	1	2	3	4
3	Reading	53	32	9	0	7	1	1
4	Reading	91	53	17	2	11	2	2
4	Writing	58	31	13	7	1	2	3
7	Reading	105	80	17	2	8	5	4
7	Writing	75	42	17	11	1	0	5
8	Math	81	45	15	0	12	0	3
8	Science	90	58	15	4	0	4	1

Table 2. Configuration of 2000 CSAP Assessments by Grade, Content Standard, and Item Type

Grade	Content Area	Item Type	Standard 1		Standard 2		Standard 3		Standard 4		Standard 5		Standard 6	
			# of Items	Total Pts.	# of Items	Total Pts.	# of Items	Total Pts.	# of Items	Total Pts.	# of Items	Total Pts.	# of Items	Total Pts.
3	Reading	MC	32	32										
		CR	9	21										
4	Reading	MC	24	24					14	14	12	12	3	3
		CR	3	4					4	8	3	8	7	18
4	Writing	MC			6	6	25	25						
		CR			6	19	7	8						
7	Reading	MC	27	27					14	14	8	8	13	13
		CR	8	17					2	8	6	15	3	7
7	Writing	MC			13	13	29	29						
		CR			6	21	11	12						

Grade	Content Area	Item Type	Standard 1/6		Standard 2		Standard 3		Standard 4/5					
			# of Items	Total Pts.	# of Items	Total Pts.	# of Items	Total Pts.	# of Items	Total Pts.				
8	Math	MC	12	12	13	12	10	10	11	11				
		CR	4	8	3	8	4	10	4	10				

Grade	Content Area	Item Type	Standard 1		Standard 2		Standard 3		Standard 4		Standard 5/6			
			# of Items	Total Pts.	# of Items	Total Pts.	# of Items	Total Pts.	# of Items	Total Pts.	# of Items	Total Pts.		
		MC	9	9	14	14	13	13	15	15	7	7		

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Writing

The 2000 CSAP fourth grade Writing assessment consisted of 44 items, 31 MC and 13 CR items, with a total of 58 points. A student thus can score a maximum of 58 points in the Writing test. All MC items have one level. The 13 CR items comprised seven 1-point, one 2-point, two 3-point, and three 4-point items with a total of 27 points.

The fourth grade Writing test measured two standards. Six MC and six CR items, with a total of 25 points, measured standard 2. Similarly, 25 MC and seven CR items, with a total of 33 points, measured standard 3.

Seventh Grade

The 2000 CSAP seventh grade assessment consisted of a single form for Reading and Writing. Sessions 1, 2, and 5 of the form assessed Writing and 3, 4, and 6 assessed Reading ability of students.

Reading

The 2000 CSAP seventh grade Reading test consisted of 77 items, 60 MC and 17 CR items, with a total of 105 points. A student thus can score a maximum of 105 points in the Reading test. All MC items have one level. The 17 CR items comprised two 1-point, six 2-point, five 3-point, and four 4-point items with a total of 45 points.

The seventh grade Reading test measured four standards. Standard 1 was measured by 27 MC and six CR items with a total of 44 points. Similarly, 14 MC and two CR items, with a total of 20 points, measured standard 4; six MC and six CR items, with a total of 21 points, measured standard 5; and 13 MC and three CR items, with a total of 20 points, measured standard 6.

Writing

The 2000 CSAP seventh grade Writing assessment consisted of 59 items, 42 MC and 17 CR items, with a total of 75 points. A student thus can score a maximum of 75 points in the Writing test. All MC items have one level. The 17 CR items comprised 11 1-point, one 2-point, and five 4-point items with a total of 33 points.

The seventh grade Writing test measured two standards. Thirteen MC and six CR items, with a total of 34 points, measured standard 2. Similarly, 29 MC and 11 CR items, with a total of 41 points, measured standard 3.

Eighth Grade

The 2000 CSAP eighth grade assessment consisted of two separate forms for Mathematics and Science. The Mathematics assessment form consisted of 60 items and the Science form consisted of 75 items. Two MC items from the Science assessment were later dropped from the analyses because of their undesirable item parameters. As a result, 73 items were scored in the Science assessment.

Mathematics

The 2000 CSAP eighth grade Mathematics assessment consisted of 60 items, 45 MC and 15 CR items, with a total of 81 points. A student thus can score a maximum of 81 points in the Mathematics test. All MC items have one level. The 15 CR items comprised 12 2-point and three 4-point items, yielding a total of 36 points.

The eighth grade Mathematics test measured six standards. Some standards, however, have very few items that possibly could result in an unstable estimate of student ability in that standard. These standards were combined to form a single standard that closely matches the objectives.

Thus, standards 1 and 6 were combined to form a single standard of 1/6, and standard 4 and 5 were combined to form a single standard of 4/5.

Standard 1/6 was measured by 12 MC and four CR items, with a total of 20 points. Similarly, 12 MC and three CR items, with a total of 20 points, measured standard 2; 10 MC and four CR items, with a total of 20 points, measured standard 3; and 11 MC and four CR items, with a total of 21 points, measured standard 4/5.

Science

The 2000 CSAP eighth grade Science test consisted of 75 items, 60 MC and 15 CR items, with a total of 92 points. As mentioned above, two MC items, however, were removed from the test after item analysis because of their undesirable measurement properties. As a result, 73 items were scored, 58 MC and 15 CR items, with a total of 90 points. All MC items have one level. The 15 CR items included four 1-point, six 2-point, four 3-point, and one 4-point item with a total of 32 points.

The eighth grade Science test is measured by six standards. Standard 1 was measured by nine MC and seven CR items, with a total of 25 points. Similarly, 14 MC and three CR items, with a total of 20 points, measured standard 2; 13 MC and three CR items, with a total of 19 points, measured standard 3; and 15 MC and one CR item, with a total of 18 points, measured standard 4. Since standard 6 consisted of only two items, it was combined with standard 5 to form a new standard of 5/6 to ensure stability in the estimates. As a result seven MC and one CR item, with a total of 8 points, measured standard 5/6.

Part 2: Results

Student results were reported statewide in terms of performance levels. Also reported was the scale score that was used to determine their Performance Level. The cut scores for the performance levels were determined by using the Bookmark standard setting procedure (Lewis, Mitzel, & Green, 1996). Performance levels for grades 3, 4, and 7 Reading and Writing were carried over from earlier years' standard setting procedures. Grade 8 Mathematics and Science standards were set in 2000.

The scale for the third grade Reading assessment has a lowest obtainable scale score (LOSS) of 300 and a highest obtainable scale score (HOSS) of 700 (see Table 3 below). The LOSS and HOSS for the fourth grade Reading and Writing assessment scales were 300 and 720; for seventh grade Reading they were 300 and 770; for seventh grade Writing 300 and 780; for eighth grade Mathematics 300 and 760; and for eighth grade Science 300 and 790, respectively.

Table 3
Lowest and Highest Obtainable Scale Scores for the CSAP Assessments

Grade	Content Area	Lowest obtainable scale score	Highest obtainable scale score
3	Reading	300	700
4	Reading	300	720
4	Writing	300	720
7	Reading	300	770
7	Writing	300	780
8	Mathematics	300	760
8	Science	300	790

Note that scale scores are not comparable across grades or subjects.

Item-pattern scoring was used to determine students' scale scores, as opposed to number-correct scoring, because it calculates a student's scale score by taking into account not only how many items a student answered correctly but also the difficulty of those items. Since item-pattern scoring takes more information into account, it is more accurate than number-correct scoring. This increase in accuracy is equivalent, on an average, to approximately a 15 to 20% increase in test length (Yen, 1984; Yen & Candell, 1991).

Summary Statistics

The summary statistics are based on the analysis of the total population of students. The mean, median, and standard deviation of scale scores for the total population and separately for gender groups for grade 3 Reading, grades 4 and 7 Reading and Writing, and grade 8 Mathematics and Science are shown in Table 4. Table 5 lists the scale score descriptive statistics and Table 6 lists the raw score descriptive statistics by content standard for the total population. Table 6 also presents the mean percent of the maximum raw score obtained for each content standard. The mean percent of maximum raw score measures the variation of item difficulty across the content standards.

Third Grade Reading

The mean scale score for the total population of students taking the 2000 third grade Reading assessment is 502 with a standard deviation of 44.1. Similarly, the mean scale score for female students is 505 with a standard deviation of 43.4 and the mean scale score for male students is 499 with a standard deviation of 44.4. Note that the male and female students do not sum to the total population because of non-response to the gender question.

Table 4. Scale Score Descriptive Statistics

Grade	Language	Content Area	Group	N*	Mean SS	SD	Median SS	alpha
3	English	Reading	All Valid Scores	53,020	502	44.1	504	0.89
			Females	25,716	505	43.4	507	
			Males	27,040	499	44.4	501	
4	English	Reading	All Valid Scores	53,570	506	46.0	510	0.93
			Females	25,772	511	44.7	513	
			Males	27,469	502	46.8	506	
4	English	Writing	All Valid Scores	52,736	509	43.7	509	0.90
			Females	25,427	517	44.2	518	
			Males	26,991	502	42.0	504	
7	English	Reading	All Valid Scores	52,327	502	49.6	506	0.93
			Females	25,193	509	48.2	512	
			Males	26,825	496	49.9	500	
7	English	Writing	All Valid Scores	51,379	501	49.0	502	0.90
			Females	24,835	509	48.6	509	
			Males	26,054	493	48.2	495	
8	English	Mathematics	All Valid Scores	52,056	496	57.0	501	0.93
			Females	25,185	496	54.2	500	
			Males	26,343	496	59.3	502	
8	English	Science	All Valid Scores	51,966	497	55.7	502	0.91
			Females	25,096	492	51.9	496	
			Males	26,244	502	58.5	508	

*N counts for females and males do not sum to the N count for all valid scores because of non-responses on the gender question.

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Table 5. Scale Score Descriptive Statistics by Content Standard. All Students

Grade	Content Area	Standard 1 (Total)* Scale Score	
		Mean	SD
3	Reading	502	44.1

Grade	Content Area	Standard 1 Scale Score		Standard 4 Scale Score		Standard 5 Scale Score		Standard 6 Scale Score		Total Scale Score	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
4	Reading	515	66.3	507	55.9	515	66.6	511	59.7	506	46.0

Grade	Content Area	Standard 2 Scale Score		Standard 3 Scale Score		Total Scale Score	
		Mean	SD	Mean	SD	Mean	SD
4	Writing	510	50.6	514	57.0	509	43.7

Grade	Content Area	Standard 1 Scale Score		Standard 4 Scale Score		Standard 5 Scale Score		Standard 6 Scale Score		Total Scale Score	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
7	Reading	503	53.8	506	63.4	519	67.3	503	59.6	502	49.6

Grade	Content Area	Standard 2 Scale Score		Standard 3 Scale Score		Total Scale Score	
		Mean	SD	Mean	SD	Mean	SD
7	Writing	502	55.2	503	55.2	501	49.0

Grade	Content Area	Standard 1/6 Scale Score		Standard 2 Scale Score		Standard 3 Scale Score		Standard 4/5 Scale Score		Total Scale Score	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
8	Math	497	72.9	496	66.7	495	67.6	496	71.5	496	57.0

Grade	Content Area	Standard 1 Scale Score		Standard 2 Scale Score		Standard 3 Scale Score		Standard 4 Scale Score		Standard 5/6 Scale Score		Total Scale Score	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
8	Science	501	70.8	499	67.0	500	70.3	497	69.4	515	106.5	497	55.7

* Only Standard 1 measured in grade 3 Reading.

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Table 6. Raw Score Descriptive Statistics by Content Standard, All Students

Grade 3 Reading

Standard 1 (Total)*		
Mean	SD	Mean % of Max.
39	9.68	74.1%

Grade 4 Reading

Standard 1			Standard 4			Standard 5			Standard 6			Total		
Mean	SD	Mean % of Max.	Mean	SD	Mean % of Max.	Mean	SD	Mean % of Max.	Mean	SD	Mean % of Max.	Mean	SD	Mean % of Max.
22	5.3	78.9%	14	4.4	65.7%	15	3.9	73.1%	14	4.3	67.3%	65	18.4	71.8%

Grade 4 Writing

Standard 2			Standard 3			Total		
Mean	SD	Mean % of Max.	Mean	SD	Mean % of Max.	Mean	SD	Mean % of Max.
16	3.8	64.0%	25	6.0	74.4%	41	9.1	69.9%

Grade 7 Reading

Standard 1			Standard 4			Standard 5			Standard 6			Total		
Mean	SD	Mean % of Max.	Mean	SD	Mean % of Max.	Mean	SD	Mean % of Max.	Mean	SD	Mean % of Max.	Mean	SD	Mean % of Max.
30	8.0	68.0%	14	3.6	68.6%	16	4.4	73.9%	11	4.0	56.6%	70	18.3	67.0%

Grade 7 Writing

Standard 2			Standard 3			Total		
Mean	SD	Mean % of Max.	Mean	SD	Mean % of Max.	Mean	SD	Mean % of Max.
22	5.7	64.4%	29.3	6.5	71.4%	51.2	11.5	68.3%

Grade 8 Math

Standard 1/6			Standard 2			Standard 3			Standard 4/5			Total		
Mean	SD	Mean % of Max.	Mean	SD	Mean % of Max.	Mean	SD	Mean % of Max.	Mean	SD	Mean % of Max.	Mean	SD	Mean % of Max.
11	4.9	55.6%	11	4.1	56.3%	10	4.3	50.4%	12	4.7	56.1%	44	16.5	54.6%

Grade 8 Science

Standard 1			Standard 2			Standard 3			Standard 4			Standard 5/6			Total		
Mean	SD	Mean % of Max.	Mean	SD	Mean % of Max.	Mean	SD	Mean % of Max.	Mean	SD	Mean % of Max.	Mean	SD	Mean % of Max.	Mean	SD	Mean % of Max.
16	5.0	65.1%	11	3.7	56.9%	12	3.4	60.6%	10	3.6	57.6%	5	1.8	66.0%	55	15.1	60.9%

* Only Standard 1 measured in grade 3 Reading.

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The scale score frequency distribution of the third grade Reading assessment for the total population is shown in Appendix A-1. Similarly, Figures 1, 2, and 3 graphically represent the scale score frequency distributions for the total population, male, and female, respectively. The figures show that the distributions of scale scores for the total population and for gender groups are approximately normal.

The grade 3 Reading test has only one standard. The mean percent of the maximum raw score for the total test in grade 3 Reading is 74.1%.

Fourth Grade Reading

The mean scale score for the total population of students taking the 2000 fourth grade Reading assessment is 506 with a standard deviation of 46.0. The mean scale score for female students is 511 with a standard deviation of 44.7 and that for male students is 502 with a standard deviation of 46.8.

The scale score frequency distribution for the total population is shown in Appendix A-2. Figures 4, 5, and 6 graphically represent the frequency distributions for total population, male, and female, respectively. The figures show that the distributions of scale scores for total population and by gender group are approximately normal.

The mean scale scores for standards range from a minimum of 507 on Standard 4 to a maximum of 515 on Standards 1 and 5. This range is relatively small indicating that students performed similarly on all reading standards.

The mean percent of the maximum raw scores ranges from a low of 65.7% on Standard 4 to a high of 78.9% on Standard 1. The relatively smaller range of the mean percent of maximum scores across the content standards indicates that the average item difficulty did not vary much across content standards. The mean percent of the maximum raw score for the total test is 71.8%.

Fourth Grade Writing

The mean scale score for the total population on the 2000 fourth grade Writing assessment is 509 with a standard deviation of 43.7. The mean scale score for female students is 517 with a standard deviation of 44.2 and the mean scale score for male students is 502 with a standard deviation of 42.0.

The frequency distribution of scale scores for the total population is shown in Appendix A-3. Figures 7, 8, and 9 graphically represent the frequency distributions for total population, male, and female, respectively. The distributions of scale scores for the total population and for gender groups are approximately normal.

The mean scale score for Standard 2 is 510 with a standard deviation of 50.8 and Standard 3 is 514 with a standard deviation of 57. The scale score range between the two standards is relatively small, indicating that students performed similarly on Standards 2 and 3.

The mean percent of the maximum raw score for Standard 2 is 64% and for Standard 3 is 74.4%. The range of the mean percent of maximum raw scores between standards 2 and 3 is relatively small, indicating that the average item difficulty did not vary much between the two content standards. The mean percent of the maximum raw score for the total test is 69.9%.

Seventh Grade Reading

The mean scale score for the total population on the 2000 seventh grade Reading assessment is 502 with a standard deviation of 49.6. The mean scale score for female students is 509 with a standard deviation of 48.2 and the mean scale score for male students is 496 with a standard deviation of 49.9.

The scale score frequency distribution for the total population is shown in Appendix A-4. Figures 10, 11, and 12 graphically represent the frequency distributions for total population, male, and female respectively. The figures indicate that the distribution of scale scores for the total population and by gender is approximately normal.

The mean scale scores range from a minimum of 503 on Standards 1 and 6 to a maximum of 519 on Standard 5. This range is relatively small, indicating that students performed similarly on each of the standards.

The mean percent of the maximum raw scores ranged from a minimum of 55.6% on Standard 6 to a maximum of 73.9% on Standard 5. This range is also relatively small, indicating that the average item difficulty did not vary much across the standards. The mean percent of the maximum raw score for the total test is 67.0%.

Seventh Grade Writing

The mean scale score for the total population on the 2000 seventh grade Writing assessment is 501 with a standard deviation of 49.0. The mean scale score for female students is 509 with a standard deviation of 48.6 and the mean scale score for male students is 493 with a standard deviation of 48.2.

The scale score frequency distribution for the total population is shown in Appendix A-5. Figures 13, 14, and 15 graphically represent the frequency distributions for the total population, male, and female respectively. The figures indicate that the distributions of scale scores are approximately normal for the total population and separately for gender groups.

The mean scale score for Standard 2 is 502 and for Standard 3 is 503 with a standard deviation of 55.2 for both. The scale score range between the standards is minimal, suggesting that students performed similarly on Standards 2 and 3.

The mean percent of the maximum raw score for Standard 2 is 64.4% and for Standard 3 is 71.4%. These values are of similar magnitude, indicating that the item difficulty did not vary much between Standards 2 and 3. The mean percent of the maximum raw score for the total test is 68.3%.

Eighth Grade Mathematics

The mean scale score for the total population is 496 with a standard deviation of 57.0 for the 2000 eighth grade Mathematics assessment. The mean scale score for female students is 496 with a standard deviation of 54.2 and the mean scale score for male students is 496 with a standard deviation of 59.3.

The scale score frequency distribution for the total population is shown in Appendix A-6. Figures 16, 17, and 18 graphically represent the frequency distributions for total population, male, and female respectively. The distributions of scale scores are approximately normal for the total population as well as for gender groups.

The mean scale scores for standards range from a minimum of 495 on Standard 3 to a maximum of 497 on Standard 1. The scale score range between standards is minimal, suggesting that students performed equally well across the four Mathematics standards.

The mean percent of the maximum raw scores ranged from a minimum of 50.4% on Standard 3 to a maximum of 56.3% on Standard 2. This range is also relatively small, indicating that the average item difficulty did not vary much across the standards. The mean percent of the maximum raw score for the total test is 54.6%.

Eighth Grade Science

The mean scale score for the total population on the 2000 eighth grade Science assessment is 497 with a standard deviation of 55.7. The mean scale score for female students is 492 with a standard deviation of 51.9 and the mean scale score for male students is 502 with a standard deviation of 58.5.

The scale score frequency distribution for the total population is shown in Appendix A-7. Figures 19, 20, and 21 graphically represent the frequency distributions for total population, male, and female, respectively. The distributions of scale scores are approximately normal for the total population as well as for the gender groups.

The mean scale scores range from a minimum of 497 on Standard 4 to a maximum of 515 on Standard 5/6. This range is relatively small, indicating that students performed similarly on each of the standards.

The mean percent of the maximum raw scores ranged from a minimum of 56.9% on Standard 2 to a maximum of 66.0% on Standard 5/6. This range is also relatively small, indicating that the average item difficulty did not vary much across the standards. The mean percent of the maximum raw score for the total test is 60.9%.

The Relationship Among the Standards

Table 7 shows the correlations among the students' scale scores by standard for the fourth and seventh grade Reading and Writing, and eighth grade Mathematics and Science assessments. Note that grade 3 has only one standard. The correlations among Standards 1, 4, 5, and 6 for the fourth grade Reading assessment are positive, as expected, and range from 0.62 to 0.72. Similarly, the correlations between the standards and total are positive, ranging from a minimum of 0.81 to a maximum of 0.90.

The correlation between Standards 2 and 3 of the fourth grade Writing assessment is 0.64. Similarly, the correlations between the standards and total are positive, ranging from 0.88 to 0.89.

The correlations among Standards 1, 4, 5, and 6 for the seventh grade Reading assessment are positive, as would be expected, and range from 0.62 to 0.79. The correlations between the standards and total are also positive ranging from 0.76 to 0.95. Seventh grade Writing Standards 2 and 3 are also positively related with a correlation coefficient of 0.74. The correlation between Standard 2 and the total is 0.92 and that between Standard 3 and the total is 0.93.

For eighth grade Mathematics assessment, correlations among standards are positive and range from 0.74 to 0.76, and between standards and total from 0.88 to 0.90. The correlations among standards for grade 8 Science range from 0.55 to 0.70, and between the standards and total range from 0.69 to 0.87.

Table 7. Correlations by Content Standard

Grade 4 - Reading						
Standard 1	Standard 4	Standard 5	Standard 6	Total	Variable	N
1	0.69**	0.62**	0.65**	0.84**	Standard 1	53570
	1	0.66**	0.72**	0.90**	Standard 4	53570
		1	0.63**	0.81**	Standard 5	53570
			1	0.85**	Standard 6	53570

Grade 4 - Writing				
Standard 2	Standard 3	Total	Variable	N
1	0.84**	0.88**	Standard 2	52736
	1	0.89**	Standard 3	52736

Grade 7 - Reading						
Standard 1	Standard 4	Standard 5	Standard 6	Total	Variable	N
1	0.77**	0.67**	0.79**	0.95**	Standard 1	52327
	1	0.62**	0.71**	0.86**	Standard 4	52327
		1	0.62**	0.78**	Standard 5	52327
			1	0.86**	Standard 6	52327

Grade 7 - Writing				
Standard 2	Standard 3	Total	Variable	N
1	0.74**	0.92**	Standard 2	51379
	1	0.91**	Standard 3	51379

Grade 8 - Mathematics						
Standard 1/6	Standard 2	Standard 3	Standard 4/5	Total	Variable	N
1	0.76**	0.75**	0.74**	0.90**	Standard1/6	52056
	1	0.76**	0.75**	0.90**	Standard 2	52056
		1	0.74**	0.89**	Standard 3	52056
			1	0.88**	Standard4/5	52056

Grade 8 Science							
Standard 1	Standard 2	Standard 3	Standard 4	Standard 5/6	Total	Variable	N
1	0.68**	0.65**	0.66**	0.55**	0.86**	Standard 1	51986
	1	0.70**	0.70**	0.57**	0.87**	Standard 2	51986
		1	0.70**	0.55**	0.86**	Standard 3	51986
			1	0.56**	0.86**	Standard 4	51986
				1	0.69**	Standard 5/6	51986

** Correlation is significant at the 0.01 level (2-tailed).

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Test Reliability

Reliability is an index of the consistency of test results. A reliable test is one that produces scores that are expected to be relatively stable if the test is administered repeatedly under similar conditions. Cronbach's alpha is a frequently used measure of internal consistency. Based on a single administration of a test, Cronbach's alpha provides a reliability estimate that equals the average of all split-half coefficients that would be obtained on all possible divisions of the test into halves. Such a split-half coefficient would be obtained by correlating one half of the test with the other half and then adjusting the correlation with the Spearman-Brown formula so that it applies to the whole test (see Allen & Yen, 1979, pp. 83-88).

Table 4 on page 7 shows the estimated reliability index (Cronbach's alpha) for Reading, Writing, Mathematics, and Science for the 2000 assessment. The alpha for the third grade Reading assessment is 0.89, that for fourth grade Reading 0.93, fourth grade Writing 0.90, seventh grade Reading 0.93, seventh grade Writing 0.90, eighth grade Mathematics 0.93, and eighth grade Science is 0.91. The high values of Cronbach's alpha for all grades and content areas indicate that the Colorado 2000 assessment had strong internal consistency and that the test will produce relatively stable scores if administered repeatedly under similar conditions.

Part 3: Item Analyses

Item analysis results, for both multiple choice and constructed response items, are based on the analysis of the total population. The product-moment coefficient is used to estimate the item to total score correlation for each item. It was computed by dropping the score of the item in question from the total. In other words, the coefficient for each item is based on the item score itself and a score computed as the total of all items except that item. For items having only two levels, the product-moment coefficient is the point-biserial correlation. The p-value for each MC item is the percent of all students who responded with a correct answer. For the CR items, the p-value is the weighted average of percents across categories divided by the number of category levels. The point-biserials and p-values were computed by considering all responses that were omits, multiple marked, no response, refusal, illegible, or written in language other than English as missing responses.

Third Grade Reading

Table 8 lists the results of the multiple-choice item analyses for the 2000 third grade Reading assessment. The point-biserials for all of the multiple-choice items are positive, ranging from 0.19 to 0.52 with a mean of 0.39. The p-values for these items range from 0.53 to 0.94 with a mean of 0.74.

Table 9 lists the results of the constructed-response item analyses for the third grade Reading assessment. The item to total score correlations for all of the constructed-response items are positive, ranging from 0.34 to 0.58 with a mean of 0.45. The p-values for the constructed-response items range from 0.39 to 0.92, with a mean of 0.70. An examination of the percent of students obtaining each score point for the constructed-response items shows that there is a good amount of variability in students' responses to most items, indicating that these items work well over the range of student ability.

Table 8. Multiple-Choice Item Analyses, Grade 3, Reading

Book Item#	Pt. Bis.	Omit	p-Value (All Students)	Book Item#	Pt. Bis.	Omit	p-Value (All Students)
1	0.33	1.9%	0.80	20	0.48	2.7%	0.78
2	0.28	2.2%	0.94	21	0.39	3.2%	0.57
4	0.47	1.9%	0.83	23	0.43	2.0%	0.71
6	0.37	2.3%	0.84	24	0.38	1.9%	0.89
7	0.38	2.0%	0.85	25	0.44	2.1%	0.86
8	0.46	2.2%	0.82	26	0.42	2.1%	0.82
9	0.23	3.1%	0.59	27	0.43	2.2%	0.75
10	0.29	2.0%	0.80	28	0.42	2.1%	0.85
11	0.33	2.1%	0.66	29	0.50	2.1%	0.81
12	0.35	2.3%	0.80	31	0.39	2.1%	0.62
13	0.50	2.6%	0.80	33	0.45	3.4%	0.86
14	0.22	2.2%	0.54	34	0.40	2.2%	0.70
15	0.51	2.4%	0.77	35	0.42	2.6%	0.85
16	0.51	2.9%	0.72	38	0.43	2.7%	0.83
17	0.36	2.2%	0.86	39	0.38	2.8%	0.73
18	0.39	2.4%	0.53	40	0.19	2.6%	0.70

Ave. Pt. Bis.: 0.39

Ave. p-Value:0.74

Table 9. Constructed-Response Item Analyses, Grade 3, Reading

Book Item #	Item-Test Corr.	Percent of Students (N=54,197) Obtaining Score Level						p-Value (All Students)
		0	1	2	3	4	Omit	
3	0.36	1.4%	5.5%	88.8%	*	*	4.3%	0.92
5	0.38	14.1%	13.7%	69.9%	*	*	2.3%	0.77
19	0.39	48.3%	23.8%	26.8%	*	*	3.1%	0.39
22	0.56	5.7%	8.9%	18.5%	25.6%	37.5%	3.8%	0.68
30	0.58	19.9%	13.7%	63.3%	*	*	3.1%	0.70
32	0.52	14.9%	60.1%	22.2%	*	*	2.8%	0.52
36	0.47	20.6%	53.9%	22.8%	*	*	2.8%	0.50
37	0.43	2.0%	2.0%	9.8%	83.1%	*	3.1%	0.90
41	0.34	2.1%	8.0%	86.9%	*	*	3.1%	0.91

Ave. Item-Test Corr.: 0.45

Ave. p-Value: 0.70

* Does not apply

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For five of the nine constructed-response items, over half of the students obtained the highest possible score points. The remaining students are well distributed across the remaining score points, indicating that these items still produced a reasonable amount of variability.

The omit rate for the 2000 third grade Reading assessment was small, ranging from 1.9% to 3.4% for multiple-choice items (Table 8) and 2.3% to 4.3% for constructed-response items (Table 9), indicating that the assessment was not speeded.

Fourth Grade Reading

Table 10 lists the results of the multiple-choice item analyses for the 2000 fourth grade Reading assessment. The point-biserials for the multiple-choice items are positive, ranging from 0.16 to 0.54, with a mean of 0.40. The p-values for the multiple-choice items range from 0.30 to 0.92 with a mean of 0.74.

Table 11 lists the results of the constructed-response item analyses. The item to total score correlation for all of the constructed-response items are positive, ranging from 0.24 to .63 with a mean of 0.46. The p-values for the constructed-response items range from 0.43 to 0.84 with a mean of 0.63. An examination of the percent of students obtaining each score point for the Reading constructed-response items shows that there is a good amount of variability in students' responses to most items, indicating that these items work well over the range of student ability.

The omit rate for the 2000 fourth grade Reading assessment was small ranging from 1.7% to 7.5% for multiple-choice items (Table 10) and 2.4% to 7.9% for constructed-response items with only three items having greater than 5% (Table 11), indicating that the assessment was not speeded.

Table 10. Multiple-Choice Item Analyses, Grade 4, Reading

Book Item #	Session	Standard	Pt. Bis.	Omit	p-Value (All Students)	Book Item #	Session	Standard	Pt. Bis.	Omit	p-Value (All Students)
1	3	1	0.50	1.7%	0.89	39	4	4	0.46	2.1%	0.78
2	3	4	0.33	1.9%	0.59	40	4	6	0.39	2.5%	0.71
3	3	4	0.46	1.8%	0.87	41	4	4	0.27	2.1%	0.45
4	3	1	0.44	1.8%	0.81	42	4	4	0.51	3.1%	0.73
5	3	1	0.25	2.1%	0.35	43	4	1	0.43	2.1%	0.62
6	3	1	0.45	2.2%	0.85	44	4	5	0.42	2.5%	0.73
7	3	1	0.42	1.7%	0.90	45	4	1	0.45	2.3%	0.91
8	3	1	0.43	1.8%	0.88	46	4	1	0.37	2.4%	0.89
9	3	4	0.46	1.8%	0.72	47	4	4	0.45	2.1%	0.79
10	3	1	0.35	2.8%	0.89	48	4	4	0.22	2.3%	0.43
12	3	4	0.40	1.9%	0.81	49	4	4	0.28	2.4%	0.30
13	3	1	0.42	1.9%	0.83	50	4	4	0.46	2.2%	0.72
15	3	6	0.31	2.8%	0.72	51	4	1	0.51	2.3%	0.79
16	3	4	0.34	2.1%	0.50	52	4	1	0.44	2.3%	0.73
18	3	1	0.38	2.5%	0.80	89	6	6	0.41	2.0%	0.70
19	3	4	0.54	3.2%	0.88	93	6	5	0.38	2.4%	0.67
26	3	1	0.48	6.2%	0.78	95	6	5	0.40	2.6%	0.87
27	3	4	0.48	7.5%	0.86	96	6	5	0.35	2.6%	0.92
28	3	1	0.39	6.2%	0.89	97	6	5	0.18	2.6%	0.37
29	3	1	0.42	6.2%	0.88	98	6	5	0.28	2.7%	0.70
30	4	1	0.41	1.9%	0.69	99	6	5	0.29	2.4%	0.89
31	4	1	0.41	2.0%	0.78	100	6	5	0.23	2.5%	0.77
33	4	1	0.49	2.3%	0.86	101	6	5	0.39	2.6%	0.57
34	4	5	0.41	2.3%	0.80	102	6	5	0.42	2.6%	0.75
35	4	1	0.51	1.9%	0.90	103	6	1	0.38	2.6%	0.90
36	4	5	0.46	2.0%	0.75	104	6	1	0.46	2.7%	0.75
38	4	1	0.44	2.1%	0.69						

Ave. Pt. Bis.: 0.40

Ave. p-Value: 0.74

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Table 11. Constructed-Response Item Analyses, Grade 4, Reading

Book Item #	Session	Standard	Item-Test Corr.	Percent of Students (N=54,827) Obtaining Score Level						p-Value (All Students)
				0	1	2	3	4	Omit	
11	3	5	0.40	8.9%	39.1%	49.3%	*	*	2.7%	0.69
14	3	4	0.42	19.5%	57.8%	19.8%	*	*	2.9%	0.49
17	3	6	0.34	16.4%	67.0%	13.1%	*	*	3.5%	0.47
20	3	6	0.36	38.9%	33.7%	26.3%	*	*	3.1%	0.43
21	3	6	0.61	6.1%	13.8%	19.2%	54.8%	*	4.1%	0.72
22	3	6	0.24	4.8%	7.3%	83.4%	19.6%	*	4.9%	0.64
23	3	4	0.41	15.4%	42.4%	34.8%	*	*	7.4%	0.56
24	3	6	0.53	21.7%	18.8%	53.7%	*	*	5.7%	0.63
25	3	4	0.44	8.5%	23.1%	60.6%	*	*	7.9%	0.72
32	4	5	0.49	5.0%	7.2%	19.5%	10.9%	54.9%	2.5%	0.75
37	4	4	0.44	10.3%	29.3%	57.5%	*	*	3.0%	0.72
87	6	1	0.31	46.0%	51.5%		*	*	2.5%	0.51
89	6	6	0.63	4.9%	4.9%	3.4%	13.2%	71.2%	2.4%	0.84
90	6	1	0.53	21.6%	75.6%		*	*	2.7%	0.78
91	6	6	0.50	27.7%	17.6%	51.8%	*	*	2.7%	0.61
92	6	1	0.56	19.7%	33.9%	42.7%	*	*	3.7%	0.60
94	6	5	0.51	26.2%	23.0%	47.4%	*	*	3.4%	0.59

Ave. Item-Test Corr.: 0.48

Ave. p-Value: 0.63

* Does not apply

Fourth Grade Writing

Table 12 lists the results of the multiple-choice item analyses for the fourth grade Writing assessment. The point-biserials for the multiple-choice items are all positive ranging from 0.28 to 0.49 with a mean of 0.39. The p-values for the multiple-choice items range from 0.39 to 0.91 with a mean of 0.73.

Table 13 lists the results of the constructed-response item analyses. The item to total score correlation for all the constructed-response items are positive ranging from 0.03 to 0.54 with a mean of 0.40. The p-values for the constructed-response items range from 0.42 to 0.98 with a mean of 0.66. An examination of the percent of students obtaining each score point for the Writing constructed-response items shows that there is a good amount of variability in students' responses to most items, indicating that these items work well over the range of student ability.

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The omit rates for the 2000 fourth grade Writing assessment was small ranging from 1.9% to 5.1% for multiple-choice items (Table 12) and 0% to 3.2% for constructed-response items (Table 13), indicating that the assessment was not speeded.

Table 12. Multiple-Choice Item Analyses, Grade 4, Writing

Book Item #	Session	Standard	Pt. Bis.	Omit	p-Value (All Students)	Book Item #	Session	Standard	Pt. Bis.	Omit	p-Value (All Students)
53	5	2	0.34	2.0%	0.81	70	5	3	0.29	2.0%	0.88
54	5	2	0.28	2.0%	0.87	72	5	3	0.39	2.2%	0.86
55	5	2	0.40	2.4%	0.39	73	5	3	0.44	4.4%	0.77
56	5	2	0.42	1.9%	0.70	74	5	3	0.48	2.6%	0.64
57	5	2	0.34	2.0%	0.91	75	5	3	0.29	3.2%	0.86
58	5	2	0.38	2.2%	0.71	76	5	3	0.49	2.3%	0.82
59	5	3	0.42	1.9%	0.87	77	5	3	0.42	2.6%	0.59
60	5	3	0.36	2.0%	0.90	78	5	3	0.47	4.4%	0.82
61	5	3	0.39	2.1%	0.84	79	5	3	0.48	5.1%	0.77
62	5	3	0.38	2.4%	0.88	80	5	3	0.48	3.5%	0.88
63	5	3	0.42	2.3%	0.79	81	5	3	0.34	3.1%	0.74
64	5	3	0.44	2.4%	0.82	82	5	3	0.45	2.5%	0.58
65	5	3	0.42	3.0%	0.82	83	5	3	0.41	2.9%	0.50
66	5	3	0.48	2.4%	0.80	84	5	3	0.34	2.7%	0.50
68	5	3	0.33	2.0%	0.70	85	5	3	0.37	3.0%	0.55
69	5	3	0.28	2.0%	0.78						

Ave. Pt. Bis.: 0.39
Ave. p-Value: 0.73

Table 13. Constructed-Response Item Analyses, Grade 4, Writing

Book Item #	Session	Standard	Item-Test Corr.	Percent of Students (N=54,827) Obtaining Score Level						p-Value (All Students)
				0	1	2	3	4	Omit	
1	1	2	0.03	2.2%	97.8%	*	*	*	0.0%	0.98
1A	2	3	0.38	49.8%	47.0%	*	*	*	3.2%	0.47
1B	2	3	0.44	19.7%	77.1%	*	*	*	3.2%	0.77
1C	2	3	0.44	53.5%	43.3%	*	*	*	3.2%	0.43
1D	2	3	0.15	15.3%	81.5%	*	*	*	3.2%	0.82
1E	2	3	0.38	16.3%	80.5%	*	*	*	3.2%	0.81
1F	2	3	0.32	54.9%	41.9%	*	*	*	3.2%	0.42
2A	2	2	0.42	3.6%	10.5%	56.7%	27.1%	*	1.9%	0.68
2B	2	2	0.50	0.5%	11.7%	65.9%	20.0%	*	1.9%	0.68
2C	2	3	0.47	1.0%	22.9%	74.3%	*	*	1.8%	0.86
67	5	2	0.62	2.3%	10.2%	46.0%	33.3%	6.8%	2.3%	0.67
71	5	2	0.54	2.1%	14.6%	49.2%	27.0%	4.5%	2.8%	0.53
86	5	2	0.54	3.9%	12.1%	43.1%	30.4%	7.8%	2.8%	0.55

Ave. Item-Test Corr.: 0.40
Ave. p-Value: 0.66

* Does not apply

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Seventh Grade Reading

Table 14 lists the results of the multiple-choice item analyses for the 2000 fourth grade Reading assessment. The point-biserials for the multiple-choice items are positive, ranging from 0.17 to 0.54 with a mean of 0.35. The p-values for the multiple-choice items range from 0.28 to 0.93 with a mean of 0.72.

Table 15 lists the results of the constructed-response item analyses. The item to total score correlation for the constructed-response items are positive, ranging from 0.28 to 0.62 with a mean of 0.48. The p-values for the constructed-response items range from 0.24 to 0.86 with a mean of 0.57. An examination of the percent of students obtaining each score point for the Reading constructed-response items shows that there is a good amount of variability in students' responses to most items, indicating that these items work well over the range of student ability.

The percent of students who omitted the multiple-choice items for the 2000 grade 7 Reading assessment ranged from 2.9% to 6.3% with the majority less than 5% (Table 14). Similarly, the percentages of students who omitted the constructed-response items ranged from 3.1% to 9.4% (Table 15). Note that the constructed-response items with higher omit rates are difficult items. The relatively smaller omit rates suggest that the assessment was not speeded.

Table 14. Multiple-Choice Item Analyses, Grade 7, Reading

Book Item #	Session	Standard	Pt. Bis.	Omit	p-Value (All Students)	Book Item #	Session	Standard	Pt. Bis.	Omit	p-Value (All Students)
1	3	1	0.35	3.0%	0.68	35	4	4	0.35	3.3%	0.75
2	3	1	0.30	2.9%	0.90	42	4	6	0.31	3.2%	0.89
3	3	4	0.19	3.0%	0.76	43	4	4	0.35	3.2%	0.89
4	3	5	0.29	3.8%	0.91	44	4	6	0.41	3.3%	0.62
6	3	5	0.27	3.4%	0.92	45	4	6	0.17	3.8%	0.28
7	3	5	0.33	3.2%	0.91	50	4	4	0.42	5.8%	0.66
8	3	4	0.38	3.0%	0.67	51	4	1	0.27	5.0%	0.33
9	3	4	0.30	3.0%	0.80	52	4	1	0.34	5.0%	0.43
10	3	1	0.38	2.9%	0.71	98	6	1	0.29	3.3%	0.56
11	3	1	0.36	2.9%	0.76	99	6	1	0.41	3.4%	0.82
12	3	4	0.33	2.9%	0.80	100	6	5	0.47	3.4%	0.72
13	3	6	0.33	3.0%	0.62	101	6	1	0.37	3.3%	0.83
14	3	4	0.31	3.1%	0.61	102	6	1	0.32	6.3%	0.89
15	3	1	0.28	3.0%	0.47	103	6	4	0.44	3.4%	0.77
16	3	1	0.38	3.0%	0.76	104	6	5	0.38	3.4%	0.87
17	3	6	0.28	4.1%	0.54	105	6	5	0.20	3.4%	0.90
20	3	1	0.41	3.7%	0.84	106	6	1	0.39	3.2%	0.91
21	3	1	0.45	3.8%	0.85	107	6	1	0.49	3.2%	0.79
22	3	6	0.27	3.0%	0.66	108	6	1	0.39	3.5%	0.70
23	3	1	0.39	3.1%	0.82	109	6	4	0.31	4.3%	0.83
24	3	6	0.44	3.2%	0.60	110	6	6	0.37	3.3%	0.82
25	3	1	0.40	3.4%	0.85	111	6	6	0.37	3.4%	0.47
26	3	6	0.25	4.1%	0.66	112	6	6	0.48	4.8%	0.69
28	4	4	0.32	3.9%	0.71	113	6	1	0.38	5.6%	0.81
29	4	4	0.46	4.0%	0.55	114	6	6	0.23	3.4%	0.51
30	4	4	0.54	4.7%	0.74	115	6	6	0.36	3.5%	0.37
31	4	1	0.26	2.9%	0.85	116	6	1	0.42	3.4%	0.88
32	4	1	0.35	2.9%	0.84	117	6	1	0.41	3.7%	0.56
33	4	1	0.34	2.9%	0.93	118	6	1	0.31	3.3%	0.78
34	4	4	0.40	3.0%	0.68	119	6	1	0.52	3.4%	0.80

Ave. Pt. Bis.: 0.35
Ave. p-Value: 0.72

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Table 15. Constructed-Response Item Analyses, Grade 7, Reading

Book Item #	Session	Standard	Item-Test Corr.	Percent of Students (N=54,320) Obtaining Score Level						p-Value (All Students)
				0	1	2	3	4	Omit	
5	3	1	0.44	19.3%	17.7%	59.9%	*	*	3.1%	0.69
18	3	6	0.51	40.3%	10.7%	21.3%	18.4%	*	9.4%	0.36
19	3	1	0.44	23.5%	19.9%	27.7%	22.2%	*	6.8%	0.47
36	4	1	0.52	5.9%	8.7%	13.0%	68.3%	*	4.1%	0.80
37	4	5	0.57	4.8%	15.7%	31.3%	44.4%	*	3.8%	0.71
38	4	4	0.28	7.9%	23.7%	64.3%	*	*	4.1%	0.76
39	4	6	0.41	27.2%	62.8%	5.2%	*	*	4.8%	0.37
40	4	1	0.49	12.6%	10.0%	23.8%	48.5%	*	5.0%	0.68
41	4	5	0.46	5.7%	8.2%	81.5%	*	*	4.6%	0.86
46	4	5	0.43	25.2%	69.3%		*	*	5.6%	0.69
47	4	1	0.60	34.4%	28.8%	29.6%	*	*	7.2%	0.44
48	4	5	0.50	41.3%	51.5%		*	*	7.3%	0.51
49	4	5	0.62	13.6%	5.8%	11.8%	25.8%	35.9%	7.3%	0.82
120	6	5	0.48	11.9%	13.4%	19.5%	24.3%	25.5%	5.4%	0.57
121	6	6	0.45	20.3%	46.1%	26.9%	*	*	6.6%	0.50
122	6	1	0.44	35.4%	31.6%	17.1%	6.6%	2.6%	6.7%	0.24
123	6	4	0.48	13.9%	8.2%	61.1%	7.1%	2.5%	7.2%	0.40

Ave. Item-Test Corr.: 0.48

Ave. p-Value: 0.57

* Does not apply

Seventh Grade Writing

Table 16 lists the results of the multiple-choice item analyses for the 2000 seventh grade Writing assessment. The point-biserials for the multiple-choice items are all positive ranging from 0.19 to 0.47 with a mean of 0.35. The p-values for the multiple-choice items range from 0.29 to 0.93 with a mean of 0.66.

Table 17 lists the results of the constructed-response item analyses. The item to total score correlation for the constructed-response items are positive ranging from 0.04 to 0.59 with a mean of 0.35. The p-values for the constructed-response items range from 0.03 to 0.96 with a mean of 0.70. An examination of the percent of students obtaining each score point for the Writing constructed-response items shows that there is a good amount of variability in students' responses to most items, indicating that these items work well over the range of student ability.

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Table 16. Multiple-Choice Item Analyses, Grade 7, Writing

Book Item #	Session	Standard	Pt. Bis.	Omit	p-Value (All Students)	Book Item #	Session	Standard	Pt. Bis.	Omit	p-Value (All Students)
53	5	3	0.32	3.1%	0.83	76	5	3	0.47	3.5%	0.71
54	5	3	0.27	3.2%	0.45	77	5	3	0.32	3.5%	0.84
55	5	3	0.31	3.3%	0.59	78	5	3	0.33	3.3%	0.75
56	5	3	0.42	3.6%	0.45	79	5	3	0.34	3.3%	0.58
57	5	3	0.28	3.2%	0.44	80	5	3	0.33	3.3%	0.79
58	5	3	0.36	3.2%	0.57	81	5	3	0.19	3.6%	0.61
60	5	3	0.21	3.1%	0.93	82	5	3	0.21	3.7%	0.93
61	5	3	0.31	3.3%	0.71	83	5	3	0.23	3.7%	0.88
62	5	3	0.44	4.4%	0.77	84	5	2	0.33	3.2%	0.72
63	5	3	0.31	4.8%	0.82	85	5	2	0.44	3.2%	0.80
64	5	3	0.24	3.1%	0.51	86	5	2	0.39	3.2%	0.61
65	5	3	0.33	3.1%	0.81	87	5	2	0.46	3.3%	0.86
66	5	3	0.34	3.3%	0.48	88	5	2	0.47	3.2%	0.65
67	5	3	0.38	4.0%	0.68	89	5	2	0.41	3.2%	0.44
68	5	3	0.36	3.1%	0.87	90	5	2	0.39	3.3%	0.78
69	5	3	0.37	3.4%	0.75	91	5	2	0.37	3.3%	0.75
70	5	3	0.40	3.8%	0.77	92	5	2	0.38	3.2%	0.85
72	5	3	0.42	3.2%	0.81	93	5	2	0.44	3.4%	0.65
73	5	3	0.37	3.3%	0.56	94	5	2	0.41	3.7%	0.49
74	5	3	0.25	3.4%	0.37	95	5	2	0.31	3.3%	0.29
75	5	3	0.42	3.2%	0.61	96	5	2	0.26	3.3%	0.49

Ave. Pt. Bis.: 0.35
Ave. p-Value: 0.66

Table 17. Constructed-Response Item Analyses, Grade 7, Writing

Book Item #	Session	Standard	Item-Test Corr.	Percent of Students (N=54,070) Obtaining Score Level						p-Value (All Students)
				0	1	2	3	4	Omit	
1	1	2	0.04	4.1%	95.9%	*	*	*	0.0%	0.96
1A	2	3	0.39	29.2%	66.3%	*	*	*	4.4%	0.66
1B	2	3	0.36	14.6%	81.0%	*	*	*	4.4%	0.81
1C	2	3	0.24	5.5%	90.2%	*	*	*	4.4%	0.90
1D	2	3	0.13	2.1%	93.5%	*	*	*	4.4%	0.93
1E	2	3	0.30	9.3%	86.3%	*	*	*	4.4%	0.86
1F	2	3	0.32	15.2%	80.4%	*	*	*	4.4%	0.80
2A	2	2	0.51	2.1%	10.5%	31.5%	38.9%	13.6%	3.3%	0.61
2B	2	2	0.59	0.4%	6.1%	35.1%	41.0%	12.1%	3.2%	0.62
2C	2	3	0.46	1.3%	25.5%	70.0%	*	*	3.2%	0.83
27	3	2	0.52	2.7%	8.8%	41.9%	34.6%	7.5%	4.5%	0.57
59A	5	3	0.36	19.4%	68.9%	*	*	*	11.8%	0.69
59B	5	3	0.13	85.1%	3.0%	*	*	*	11.8%	0.03
59C	5	3	0.36	36.6%	51.6%	*	*	*	11.8%	0.52
59D	5	3	0.12	9.0%	79.2%	*	*	*	11.8%	0.79
71	5	2	0.56	1.0%	7.2%	34.2%	42.2%	10.0%	5.3%	0.61
97	5	2	0.50	0.7%	5.6%	36.8%	42.8%	9.8%	4.3%	0.62

Ave. Item-Test Corr.:0.35
Ave. p-Value: 0.70
* Does not apply

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The percentages of students who omitted the multiple-choice items in the 2000 seventh grade Writing assessment ranged from 3.1% to 4.8% (Table 16). Similarly, the percentages of students who omitted constructed-response items ranged from 0% to 11.8% with only two items being greater than 5% (Table 17), suggesting that the seventh grade Writing assessment was not speeded.

Eighth Grade Mathematics

Table 18 lists the results of the multiple-choice item analyses for the 2000 eighth grade Mathematics assessment. The point-biserials for the multiple-choice items are all positive ranging from 0.11 to 0.54 with a mean of 0.37. The p-values for the multiple-choice items range from 0.18 to 0.85 with a mean of 0.56.

Table 19 lists the results of the constructed-response item analyses. The item to total score correlation for all of the constructed-response items are positive ranging from 0.40 to 0.64 with a mean of 0.53. The p-values for the constructed-response items range from 0.26 to 0.75 with a mean of 0.50. An examination of the percent of students obtaining each score point for the Mathematics constructed-response items shows that there is a good amount of variability in students' responses to most items, indicating that these items work well over the range of student ability.

The percentages of students who omitted the multiple-choice items for the 2000 eighth grade Mathematics assessment ranged from 2.6% to 4.5% (Table 18). Similarly, the percentage of students who omitted the constructed-response items ranged from 3.6% to 12.2% with high omit rates associated with difficult items (Table 19). Since a majority of the items have relatively smaller omit rates, the test can be considered not speeded.

Table 18. Multiple-Choice Item Analyses, Grade 8, Mathematics

Book Item #	Session	Standard	Pt. Bis.	Omit	p-Value (All Students)	Book Item #	Session	Standard	Pt. Bis.	Omit	p-Value (All Students)
1	1	3	0.31	2.6%	0.81	30	2	3	0.50	3.1%	0.54
2	1	2	0.37	2.7%	0.71	31	2	1/6	0.50	3.2%	0.73
3	1	2	0.11	2.6%	0.52	32	2	2	0.40	3.2%	0.49
4	1	1/6	0.61	3.4%	0.46	34	2	2	0.22	2.9%	0.63
5	1	1/6	0.46	3.7%	0.57	35	2	4/5	0.34	2.9%	0.48
7	1	3	0.48	3.1%	0.55	37	2	2	0.50	3.5%	0.40
8	1	4/5	0.29	2.9%	0.53	38	2	4/5	0.33	3.1%	0.73
9	1	4/5	0.47	2.8%	0.35	41	3	3	0.34	3.1%	0.49
10	1	2	0.39	2.8%	0.62	42	3	2	0.19	3.1%	0.68
12	1	1/6	0.32	2.7%	0.64	43	3	1/6	0.64	3.1%	0.49
13	1	1/6	0.36	2.9%	0.45	44	3	3	0.29	3.4%	0.30
14	1	2	0.36	3.4%	0.78	45	3	1/6	0.52	3.5%	0.45
15	1	4/5	0.46	3.8%	0.45	46	3	4/5	0.35	3.0%	0.73
17	1	3	0.28	2.7%	0.84	47	3	2	0.38	3.4%	0.58
18	1	3	0.28	2.9%	0.58	49	3	4/5	0.21	3.1%	0.82
21	2	1/6	0.44	3.0%	0.54	50	3	1/6	0.39	4.5%	0.67
22	2	3	0.35	2.8%	0.50	51	3	4/5	0.25	3.1%	0.85
23	2	1/6	0.43	2.9%	0.36	52	3	3	0.48	3.1%	0.58
24	2	3	0.37	2.9%	0.21	54	3	2	0.41	3.4%	0.53
25	2	1/6	0.43	3.1%	0.62	55	3	4/5	0.42	3.1%	0.72
26	2	2	0.19	3.1%	0.18	57	3	1/6	0.53	3.1%	0.37
27	2	4/5	0.36	3.0%	0.86	58	3	2	0.28	3.5%	0.79
29	2	4/5	0.41	3.0%	0.34						

Ave. Pt. Bis.: 0.37

Ave. p-Value: 0.56

Table 19. Constructed-Response Item Analyses, Grade 8, Mathematics

Book Item #	Session	Standard	Item-Test Corr.	Percent of Students (N=53,881) Obtaining Score Level						p-Value (All Students)
				0	1	2	3	4	Omit	
6	1	1/6	0.62	25.6%	42.9%	24.0%	*	*	7.6%	0.45
11	1	4/5	0.59	50.5%	22.2%	15.0%	*	*	12.2%	0.26
16	1	3	0.41	6.0%	43.6%	46.8%	*	*	3.6%	0.69
19	1	2	0.55	40.0%	18.3%	37.0%	*	*	4.8%	0.46
20	1	4/5	0.64	20.2%	11.9%	24.1%	13.1%	25.7%	5.0%	0.51
28	2	1/6	0.43	10.5%	19.4%	65.2%	*	*	4.9%	0.75
33	2	1/6	0.45	44.1%	28.8%	22.0%	*	*	5.1%	0.36
36	2	4/5	0.55	29.8%	29.6%	36.3%	*	*	4.3%	0.51
39	2	3	0.48	56.2%	8.6%	30.1%	*	*	5.1%	0.34
40	2	2	0.63	12.7%	24.3%	32.6%	19.3%	7.3%	3.8%	0.44
48	3	1/6	0.58	18.2%	26.0%	52.0%	*	*	3.8%	0.65
53	3	4/5	0.40	13.5%	39.4%	42.1%	*	*	5.0%	0.62
56	3	3	0.43	33.3%	44.6%	15.7%	*	*	6.4%	0.38
59	3	2	0.55	11.4%	34.2%	48.9%	*	*	5.5%	0.66
60	3	3	0.64	21.9%	23.1%	23.5%	12.3%	13.2%	6.0%	0.40

Ave. Item-Test Corr.: 0.53

Ave. p-Value: 0.50

* Does not apply

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Eighth Grade Science

Table 20 lists the results of the multiple-choice item analyses for the 2000 eighth grade Science assessment. The results indicated a negative point-biserials for items 4 and 10. Similarly, item responses were poorly fitted to the item response theory model and the item discrimination parameters were relatively low for the items (see Part 4 for detail). Therefore, the two items were dropped from the assessment in scoring. The point-biserials for the remaining multiple-choice items are all positive ranging from 0.16 to 0.50 with a mean of 0.34. The p-values for the multiple-choice items range from 0.21 to 0.90 with a mean of 0.65.

Table 21 lists the results of the constructed-response item analyses. The item to total score correlations for all of the constructed-response items are positive ranging from 0.22 to 0.49 with a mean of 0.39. The p-values for the constructed-response items range from 0.15 to 0.76 with a mean of 0.50. An examination of the percent of students obtaining each score point for the Science constructed-response items shows that there is a good amount of variability in students' responses to most items, indicating that these items work well over the range of student ability.

The omit rates for the multiple-choice items for the 2000 eighth grade Science assessment ranged from 2.8% to 7.8% with only one greater than 5% (Table 20). Similarly, the omit rates for the constructed-response items ranged from 3.7% to 8.5% with the highest omit rate associated with difficult items (Table 21). Since a majority of the items have omit rates less than 5% the test can be considered not speeded.

Table 20. Multiple-Choice Item Analyses, Grade 8, Science

Book Item #	Session	Standard	Pt. Bis.	Omit	p-Value (All Students)	Book Item #	Session	Standard	Pt. Bis.	Omit	p-Value (All Students)
1	1	3	0.17	2.6%	0.44	41	2	2	0.40	3.0%	0.55
2	1	3	0.37	2.6%	0.77	43	2	1	0.50	3.0%	0.68
3	1	3	0.22	2.9%	0.30	44	2	4	0.35	3.2%	0.47
4*	1	3	-0.17	2.6%	0.04	45	2	2	0.27	3.5%	0.63
5	1	3	0.39	2.6%	0.77	46	2	4	0.45	3.0%	0.68
6	1	3	0.37	4.0%	0.73	47	2	4	0.42	3.0%	0.62
7	1	2	0.31	2.9%	0.46	48	2	4	0.41	3.1%	0.52
8	1	2	0.37	2.6%	0.83	49	2	6	0.30	3.0%	0.90
9	1	2	0.43	2.9%	0.81	50	3	3	0.38	3.1%	0.67
10*	1	2	-0.01	3.1%	0.03	51	3	3	0.26	3.1%	0.47
11	1	2	0.40	2.9%	0.69	52	3	3	0.27	3.1%	0.71
12	1	4	0.27	2.9%	0.69	54	3	3	0.49	3.2%	0.70
13	1	4	0.40	2.9%	0.66	55	3	2	0.28	3.6%	0.78
14	1	4	0.33	2.9%	0.59	56	3	5	0.29	3.1%	0.71
15	1	4	0.36	3.0%	0.37	57	3	2	0.37	3.1%	0.90
16	1	4	0.36	3.0%	0.53	58	3	2	0.16	3.4%	0.39
17	1	4	0.32	2.9%	0.84	59	3	2	0.30	3.3%	0.78
18	1	5	0.36	2.9%	0.72	60	3	4	0.18	3.8%	0.21
19	1	5	0.28	2.9%	0.53	62	3	4	0.35	3.1%	0.72
26	2	1	0.30	3.1%	0.86	63	3	4	0.29	3.5%	0.66
27	2	1	0.45	3.2%	0.66	65	3	4	0.36	3.4%	0.68
28	2	1	0.39	3.2%	0.66	66	3	5	0.30	7.8%	0.59
30	2	3	0.38	3.0%	0.36	67	3	4	0.38	3.1%	0.89
32	2	3	0.33	3.0%	0.51	68	3	5	0.44	3.3%	0.54
33	2	3	0.34	3.0%	0.86	70	3	1	0.33	3.1%	0.78
34	2	3	0.32	3.0%	0.86	71	3	6	0.47	3.2%	0.74
37	2	2	0.39	3.2%	0.77	72	3	1	0.28	3.1%	0.85
38	2	2	0.25	3.0%	0.39	73	3	1	0.33	3.2%	0.83
39	2	2	0.42	3.0%	0.66	74	3	1	0.37	3.2%	0.65
40	2	2	0.41	3.2%	0.60	75	3	1	0.35	3.3%	0.80

Ave. Pt. Bis.: 0.34

Ave. p-Value: 0.65

*Items 4 and 10 were removed from the operational test results.

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Table 21. Constructed-Response Item Analyses, Grade 8, Science

Book Item #	Session	Standard	Item-Test Corr.	Percent of Students (N=53,881) Obtaining Score Level						p-Value (All Students)
				0	1	2	3	4	Omit	
20	1	1	0.43	22.3%	31.4%	42.6%	*	*	3.7%	0.58
21	1	1	0.38	23.5%	44.6%	23.1%	3.7%	*	5.0%	0.34
22	1	1	0.44	27.2%	69.2%	*	*	*	3.7%	0.69
23	1	1	0.39	2.7%	11.1%	32.2%	50.5%	*	3.6%	0.76
24	1	1	0.49	26.8%	9.1%	15.8%	23.5%	19.0%	5.8%	0.47
25	1	1	0.47	10.8%	29.1%	54.2%	*	*	5.9%	0.69
29	2	1	0.32	35.0%	60.6%	*	*	*	4.3%	0.61
31	2	3	0.22	64.3%	23.5%	3.7%	*	*	8.5%	0.15
35	2	2	0.46	46.3%	34.7%	12.0%	3.1%	*	3.8%	0.23
36	2	3	0.39	6.7%	28.2%	60.7%	*	*	4.4%	0.75
42	2	2	0.31	56.2%	40.0%	*	*	*	3.8%	0.40
53	3	3	0.40	24.8%	15.2%	55.7%	*	*	4.3%	0.63
61	3	2	0.35	53.4%	11.1%	31.3%	*	*	4.2%	0.37
64	3	4	0.52	8.6%	60.9%	17.3%	9.1%	*	4.1%	0.41
69	3	5	0.28	56.5%	39.2%	*	*	*	4.3%	0.39

Ave. Item-Test Corr.: 0.39

Ave. p-Value: 0.50

* Does not apply

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Part 4: Scaling and Calibration

Overview of the IRT Models

CTB uses item response theory (IRT) to place multiple-choice and constructed-response items on the same scale. We use item response theory methods for test analysis, scaling, equating, and to inform the item selection process. These scaling methods produce a stable scale for each subject area that is required for an assessment program to track student growth (cross-sectionally) from one year to the next.

Because the characteristics of selected-response (multiple-choice) and constructed-response (open-ended) items are different, two item response theory models are used in the analysis of test forms containing both item types. The three-parameter logistic (3PL) model (Lord & Novick, 1968; Lord, 1980) is used for the analysis of selected-response items. In this model, the probability that a student with scale score θ responds correctly to item i is

$$P_i(\theta) = c_i + \frac{1 - c_i}{1 + \exp[-1.7a_i(\theta - b_i)]}$$

where a_i is the item discrimination, b_i is the item difficulty, and c_i is the probability of a correct response by a very low-scoring student. These three parameters are estimated from the item response data.

For analysis of constructed-response items, the two-parameter partial credit model (2PPC) (Muraki, 1992; Yen, 1993) is used. The 2PPC model is a special case of Bock's (1972) nominal model. Bock's model states that the probability of an examinee with ability θ having a score at the k-th level of the j-th item is

$$P_{jk}(\theta) = P(x_j = k-1|\theta) = \frac{\exp Z_{jk}}{\sum_{i=1}^{m_j} \exp Z_{ji}}, k = 1,\ldots,m_j.$$

where m_j is the number of score levels and

$$Z_{jk} = A_{jk}\theta + C_{jk}.$$

For the special case of the 2PPC model used here, the following constraints are used:

$$A_{jk} = \alpha_j(k-1)$$
$$k = 1, 2, \ldots, m_j$$

and

$$C_{jk} = -\sum_{i=0}^{k-1}\gamma_{ji}, \text{ where } \gamma_{j0} = 0,$$

where α_j and γ_{ji} are the parameters to be estimated from the data. The first constraint implies that higher item scores reflect higher ability levels and that items can vary in their discriminations. For the 2PPC model, for each item there are $m_j - 1$ independent γ_{ji} parameters and one α_j parameter; a total of m_j independent item parameters are estimated.

The IRT models are implemented using CTB's PARDUX software (Burket, 1991). PARDUX estimates parameters simultaneously for dichotomous and polytomous items using marginal maximum likelihood procedures implemented via the EM algorithm (Bock & Aitkin, 1981; Thissen, 1982).

Scaling and Calibration of the Assessment

The items within each content area were scaled using CTB's computer program PARDUX (Burket, 1993), and a linear transformation was used to translate the PARDUX calibration scale to a unique Colorado scale. The parameter estimates are in two different parameterizations, corresponding to the two item response models (3PL and 2PPC). The location (i.e., difficulty) and discrimination parameters for the multiple-choice items are in the traditional 3PL metric and are labeled b and a, respectively. The location and discrimination parameters for the constructed-response items are in the 2PPC metric, designated g (gamma) and f (alpha), respectively. Because of the different metrics used, the 3PL (multiple-choice) parameters (a and b) are not directly comparable to the 2PPC (constructed-response) parameters (f and g). However, they can be converted to a common metric. The two metrics are related by b = g/f and a = f/1.7 (see Burket, 1993). As a result of this procedure, the MC and CR items are placed on the same scale. Note that for the 2PPC model there are $m_j - 1$ (where m_j is the number of score levels for item j) independent g's and one f, for a total of m_j independent parameters estimated for each item. For the 3PL model, there is one "a" parameter, one "b" parameter, and one pseudo-guessing parameter, "c", for each item.

Summary output tables from the PARDUX program present information on model fit for each item. Model fit information is obtained from the Z-statistic. The Z-statistic is a transformation of the chi-square (Q1) statistic that takes into account differing numbers of score levels as well as sample size:

$$Z_j = \frac{(Q_{1j} - DF)}{\sqrt{2DF}},$$

for the j_{th} item. The Z-statistic is an index of the degree to which obtained proportions of students with each item score are close to the proportions that would be predicted by the estimated thetas and item parameters. These values, along with their associated chi-squares (Q_1), are computed for ten intervals corresponding to

deciles of the theta distribution (Burket, 1991). The chi-square statistic is used to characterize item fit as "good" or "poor."

Model Fit

The model fit statistics and item parameter results are based on the analysis of a sample data set used for item calibration and scaling. The summary fit statistics for the multiple-choice and constructed-response items for different grades and content areas are shown in Tables 22 to 35.

The relationship, Z=N*4/1500, gives the approximate critical Z-value for the CSAP assessments where N is the sample size for the calibration sample. Fit statistics above this critical Z-value may indicate poor model fit.

Third Grade Reading

The critical Z-value for the 2000 third grade Reading assessment, based on the calibration sample, is Z = 123.4. The item parameters and fit statistics for the multiple-choice and constructed-response items are shown in Tables 22 and 23, respectively. The Z-statistics for all MC items and most CR items are small compared to the critical Z-value, indicating that the proportions of students obtaining each item score are close to the proportions that would be predicted by the estimated thetas and item parameters.

Item 19, a constructed-response item, exhibited Z-statistics of 153.5 that exceeded the critical Z-value of 123.4 indicating less than an optimal fit. A close examination of the detailed fit of item 19 revealed that overall student responses fit the model reasonably well with slight misfit in parts of the ability continuum where the numbers of cases are relatively small.

A detailed examination of fit for the item category response functions (ICRFs) showed that the proportion of lower ability students obtaining a 0 was slightly lower than expected, low to middle ability students obtaining a 1 was slightly higher than expected, middle to low-high ability students obtaining a 1 was slightly lower than expected, and the proportion of high-lower to middle ability students obtaining a 2 was slightly lower than expected. Note that item 19 is a relatively difficult item with a p-value of 0.40 (Table 9).

Table 22. Item Parameter and Fit Summary[1], Multiple-Choice Items, Grade 3, Reading (N=46,265)

Multiple-Choice Items									
Book Item #	a	b	c	Fit-Z	Book Item #	a	b	c	Fit-Z
1	0.78	-0.83	0.41	0.8	20	1.03	-0.95	0.14	8.9
2	0.84	-3.04	0.00	37.3	21	0.98	0.10	0.23	15.5
4	1.18	-1.22	0.24	5.8	23	0.86	-0.71	0.17	2.8
6	0.73	-1.95	0.00	9.5	24	0.90	-2.17	0.06	2.5
7	0.91	-0.13	0.29	11.0	25	1.14	-1.48	0.27	2.9
8	0.88	-0.40	0.10	5.9	26	1.42	-1.13	0.21	4.3
9	0.65	0.51	0.34	10.5	27	0.90	-0.91	0.19	0.3
10	0.79	-0.81	0.49	4.9	28	0.84	-1.85	0.00	4.7
11	0.56	-0.60	0.17	2.5	29	1.26	-1.13	0.20	2.6
12	0.64	-0.23	0.17	2.9	31	0.92	-0.06	0.25	7.4
13	1.26	-1.03	0.22	4.0	33	0.95	-1.81	0.03	5.8
14	0.34	0.31	0.20	95.0	34	0.74	-0.81	0.14	2.9
15	1.10	-1.07	0.08	2.3	35	0.94	-0.28	0.22	15.0
16	0.93	-1.00	0.02	7.2	38	0.82	-1.73	0.00	11.6
17	0.79	-1.79	0.20	1.4	39	0.77	-0.83	0.21	15.5
18	1.19	0.33	0.23	32.8	40	0.34	-1.21	0.20	2.9

[1]Multiple Choice item parameters are in the 3PL metric.

Table 23. Item Parameter and Fit Summary[1], Constructed-Response Items, Grade 3, Reading (N=46,265)

Constructed-Response Items						
Book Item #	t	d1	d2	d3	d4	Fit-Z
3	1.18	-2.13	-3.39	*	*	33.0
5	0.83	-0.40	-1.70	*	*	20.1
19	0.68	0.55	0.12	*	*	153.5
22	0.73	-1.10	-1.25	-0.45	-0.16	23.0
30	1.15	-0.45	-1.53	*	*	11.5
32	1.43	-2.28	1.84	*	*	24.3
36	1.04	-1.45	1.22	*	*	79.5
37	0.97	-1.42	-2.74	-2.45	*	26.0
41	1.01	-2.44	-2.81	*	*	23.1

[1] Constructed-response item parameters are in the 2PPC metric.

* Does not apply

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Fourth Grade Reading

The critical Z-value for the 2000 fourth grade Reading assessment, based on the calibration sample, is Z = 108.2. Fit values above this critical value may indicate poor model fit. The item parameters and fit statistics for the multiple-choice and constructed response items are shown in Tables 24 and 25, respectively.

The Z-statistics for all CR items and most MC items are smaller than the critical Z-value indicating that the proportions of students with each item score are close to the proportions that would be predicted by the estimated thetas and item parameters.

The Z-statistics for Item 98 exhibited less than optimal fit with a Z-value of 138.3. A close examination of the detail fit of the item responses indicated that the proportion of students obtaining a "1" is lower than expected for lower ability students, slightly higher than expected for middle ability students, and slightly lower than expected for middle to low-higher ability students. Note that item 98 is a relatively low discriminating (a=0.42) and easy item (p=0.72).

Table 24. Item Parameter and Fit Summary[1], Multiple-Choice Items, Grade 4, Reading (N=40,592)

Multiple-Choice Items									
Book Item #	a	b	c	Fit-Z	Book Item #	a	b	c	Fit-Z
1	1.30	-1.76	0.17	1.4	39	0.95	-0.91	0.22	2.1
2	0.59	-0.07	0.22	-0.1	40	0.80	-0.56	0.29	13.3
3	1.12	-1.51	0.29	0.6	41	0.52	0.67	0.14	1.1
4	0.92	-1.20	0.27	0.7	42	1.02	-0.82	0.17	1.7
5	0.91	1.17	0.19	8.4	43	1.06	-0.09	0.25	6.5
6	1.12	-1.28	0.33	2.7	44	0.70	-1.09	0.10	-0.2
7	1.07	-1.88	0.26	5.5	45	1.27	-1.94	0.21	0.4
8	0.96	-1.54	0.30	6.4	46	0.82	-2.07	0.20	11.9
9	0.82	-0.95	0.11	8.5	47	1.02	-0.95	0.27	2.8
10	0.76	-2.01	0.24	3.7	48	0.83	1.18	0.28	6.5
12	0.73	-1.58	0.15	1.1	49	0.94	1.16	0.13	47.5
13	0.82	-1.51	0.20	6.5	50	0.98	-0.67	0.24	2.6
15	0.51	-1.00	0.20	1.4	51	1.18	-1.02	0.21	7.0
16	0.85	0.27	0.14	5.6	52	0.91	-0.77	0.21	6.8
18	0.80	-1.87	0.00	2.6	88	0.78	-0.69	0.21	1.4
19	1.16	-0.58	0.13	3.2	93	0.98	-0.04	0.36	8.5
26	1.01	-1.20	0.08	4.0	95	0.86	-1.90	0.13	5.7
27	0.97	-1.73	0.09	6.6	96	1.00	-2.30	0.20	0.5
28	0.92	-2.08	0.09	1.8	97	0.52	1.80	0.23	6.1
29	1.00	-1.82	0.13	12.7	98	0.42	-1.07	0.20	138.3
30	0.69	-0.78	0.14	3.4	99	0.63	-2.43	0.20	1.4
31	0.76	-1.20	0.20	0.1	100	0.40	-1.70	0.20	3.7
33	1.19	-1.52	0.22	2.7	101	0.87	0.06	0.22	4.4
34	0.76	-1.31	0.22	2.8	102	0.78	-1.06	0.15	0.0
35	1.38	-1.89	0.09	9.0	103	0.88	-2.24	0.10	13.9
36	0.78	-1.22	0.07	4.5	104	1.04	-0.74	0.27	12.9
38	0.91	-0.49	0.23	13.6					

[1]Multiple Choice item parameters are in the 3PL metric.

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Table 25. Item Parameter and Fit Summary[1], Constructed-Response Items. Grade 4. Reading (N=40,592)

Constructed-Response Items						
Book Item #	f	a1	a2	a3	a4	Fit-Z
11	0.77	-1.92	-0.23	*	*	11.3
14	0.84	-1.43	1.30	*	*	47.7
17	0.73	-1.64	1.84	*	*	60.8
20	0.57	-0.03	0.40	*	*	54.1
21	0.97	-1.49	-0.82	-0.97	*	29.0
22	0.44	-0.22	-2.34	1.22	*	44.8
23	0.80	-1.11	0.34	*	*	42.2
24	0.95	-0.27	-1.00	*	*	15.6
25	0.83	-1.11	-1.03	*	*	1.5
32	0.53	-0.92	-1.43	0.45	-1.57	16.9
37	0.77	-1.57	-0.74	*	*	31.2
87	0.71	-0.20		*	*	19.1
89	0.90	-1.58	-0.76	-2.00	-1.77	89.2
90	1.57	-1.92		*	*	12.6
91	0.77	0.05	-1.01	*	*	32.1
92	1.22	-1.31	-0.02	*	*	7.2
94	0.87	-0.28	-0.61	*	*	25.2

[1] Constructed-response item parameters are in the 2PPC metric.

* Does not apply

Fourth Grade Writing

The critical Z-value for the 2000 fourth grade Writing assessment, based on the calibration sample, is Z = 107.8. Fit values above this critical value may indicate poor model fit. The item parameters and fit statistics for the multiple-choice and constructed response items are shown in Tables 26 and 27, respectively. The Z-statistics for all MC items and most CR items are small compared to the critical Z-value indicating that the proportions of students with each item score are close to the proportions that would be predicted by the estimated thetas and item parameters.

The Z-statistics for Item 2A exhibited less than an optimal fit with a Z-statistic of 190.6 that exceeded the critical Z-value of 107.8. A close examination of the item characteristic curve (ICC) for the item indicated that overall the student responses fit the model reasonably well.

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Table 26. Item Parameter and Fit Summary[1], Multiple-Choice Items, Grade 4, Writing (N=40,438)

Multiple-Choice Items									
Book Item #	a	b	c	Fit-Z	Book Item #	a	b	c	Fit-Z
53	0.50	-0.57	0.09	8.89	70	0.62	-2.38	0.20	0.18
54	0.46	-0.58	0.24	0.56	72	0.85	-1.72	0.20	14.26
55	1.05	0.61	0.12	22.78	73	0.77	-1.38	0.05	2.35
56	0.84	-0.66	0.20	3.08	74	1.01	-0.38	0.18	6.61
57	0.82	-2.32	0.20	6.00	75	0.44	-0.69	0.20	40.66
58	0.53	-1.36	0.00	26.74	76	1.18	-1.31	0.15	11.54
59	1.09	-1.53	0.29	2.26	77	0.84	-0.20	0.16	4.20
60	0.89	-2.09	0.20	2.35	78	0.88	-1.63	0.00	14.83
61	0.76	-1.80	0.09	1.41	79	0.84	-1.30	0.07	9.74
62	0.78	-2.24	0.00	1.00	80	0.95	-0.67	0.12	7.18
63	0.91	-1.11	0.22	1.85	81	0.69	-0.79	0.26	2.12
64	1.11	-1.13	0.27	5.51	82	0.78	-0.31	0.07	5.73
65	0.91	-1.37	0.20	4.70	83	1.17	0.34	0.20	18.18
66	1.03	-1.17	0.17	7.04	84	0.79	0.36	0.20	5.10
68	0.69	-0.44	0.32	0.93	85	0.66	-0.07	0.14	2.55
69	0.44	-2.17	0.00	0.23					

[1]Multiple Choice item parameters are in the 3PL metric.

Table 27. Item Parameter and Fit Summary[1], Constructed-Response Items, Grade 4, Writing (N=40,438)

Constructed-Response Items						
Book Item #	f	a1	a2	a3	a4	Fit-Z
1	0.45	-5.31	*	*	*	1.0
1A	0.98	-0.02	*	*	*	2.4
1B	1.29	-1.96	*	*	*	3.4
1C	1.23	0.17	*	*	*	18.8
1D	0.40	-1.79	*	*	*	30.3
1E	1.20	-2.16	*	*	*	10.2
1F	0.77	0.23	*	*	*	4.4
2A	0.71	-1.68	-2.09	0.85	*	190.6
2B	1.19	-5.56	-2.61	1.59	*	26.4
2C	1.33	-5.40	-1.74	*	*	4.7
67	0.88	-2.56	-2.10	0.31	2.23	14.4
71	0.98	-3.09	-1.80	0.75	2.64	25.4
86	0.87	-1.97	-1.81	0.40	1.97	68.4

[1] Constructed-response item parameters are in the 2PPC metric.

* Does not apply

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A detailed examination of ICRFs and fit indices indicate that the proportion of lower ability students obtaining a 0 was lower than expected; lower ability students obtaining a 1 was higher than expected; that of lower ability students obtaining a 2 was slightly lower than expected, middle ability students was slightly higher than expected, and middle to high ability students was lower than expected; lower to middle ability students obtaining a 3 was slightly lower than expected and higher ability students was higher than expected. Note that item 2A is a relatively easy item with a p-value of 0.70 (Table 13).

Seventh Grade Reading

The critical Z value for the 2000 seventh grade Reading assessment, based on the calibration sample, is Z = 91.0. Fit values above this critical value may indicate poor model fit. The item parameters and fit statistics for the multiple-choice and constructed response items are shown in Tables 28 and 29, respectively. They indicate that the model fitted all items of the seventh grade Reading assessment reasonably well. The Z-statistics for all the MC and CR items are small compared to the critical Z-value indicating that the proportions of students with each item score are close to the proportions that would be expected by the estimated thetas and item parameters.

Table 28. Item Parameter and Fit Summary[1], Multiple-Choice Items, Grade 7, Reading (N=34,108)

Multiple-Choice Items									
Book Item #	a	b	c	Fit-Z	Book Item #	a	b	c	Fit-Z
1	0.58	-0.91	0.10	0.12	35	0.58	-1.53	0.00	4.28
2	0.80	-2.35	0.20	2.25	42	0.79	-2.13	0.20	8.71
3	0.32	-1.94	0.20	0.73	43	0.88	-2.26	0.00	19.28
4	0.87	-2.41	0.20	1.26	44	0.83	-0.22	0.20	1.87
6	0.79	-2.63	0.20	1.99	45	0.60	2.17	0.17	8.85
7	0.96	-2.26	0.14	0.84	50	0.82	-0.54	0.13	0.58
8	0.69	-0.53	0.20	2.09	51	0.71	1.19	0.13	3.04
9	0.53	-1.74	0.16	2.10	52	0.82	0.68	0.17	2.14
10	0.62	-1.21	0.00	-0.42	98	0.64	0.38	0.27	0.39
11	0.73	-0.99	0.25	1.06	99	1.04	-1.06	0.35	4.68
12	0.66	-1.38	0.23	2.25	100	1.04	-0.66	0.20	2.78
13	0.64	-0.11	0.26	4.38	101	0.83	-1.34	0.32	4.09
14	0.61	-0.02	0.26	13.84	102	0.61	-2.67	0.20	25.61
15	0.56	0.68	0.18	-0.49	103	1.11	-0.78	0.33	1.83
16	0.72	-1.28	0.12	-0.53	104	0.95	-1.80	0.18	0.94
17	0.51	0.18	0.19	4.61	105	0.52	-3.08	0.20	4.23
20	1.05	-1.25	0.31	0.19	106	1.55	-1.83	0.27	2.77
21	1.21	-1.30	0.28	0.40	107	1.16	-1.11	0.15	13.18
22	0.65	-2.35	0.20	2.77	108	0.85	-0.54	0.26	1.46
23	0.95	-1.22	0.27	6.32	109	0.63	-1.86	0.20	3.77
24	0.91	-0.23	0.14	1.27	*110	0.81	-1.48	0.20	1.20
25	0.90	-1.62	0.16	0.12	111	0.76	0.45	0.16	2.01
26	0.42	-0.52	0.20	9.71	112	0.92	-0.69	0.12	3.15
28	0.55	-0.88	0.20	8.43	113	0.72	-1.63	0.13	3.55
29	1.25	0.14	0.20	6.11	114	0.41	0.49	0.16	0.28
30	1.18	-0.79	0.18	1.21	115	0.98	0.86	0.15	2.58
31	0.52	-2.27	0.20	9.21	116	0.75	-0.73	0.11	0.35
32	0.74	-1.70	0.20	2.84	117	1.06	0.22	0.24	3.93
33	1.40	-2.09	0.28	2.61	118	0.61	-1.44	0.20	37.48
34	0.78	-0.53	0.20	5.85	119	1.23	-0.13	0.16	1.94

[1]Multiple Choice item parameters are in the 3PL metric.

Table 29. Item Parameter and Fit Summary[1], Constructed-Response Items, Grade 7, Reading (N=34,108)

Constructed-Response Items						
Book Item #	f	a1	a2	a3	a4	Fit-Z
5	0.72	-0.33	-1.20	*	*	41.84
18	0.72	1.34	-0.54	0.58	*	12.33
19	0.61	0.02	-0.28	0.49	*	11.37
36	0.82	-1.27	-0.92	-1.67	*	28.32
37	1.02	-2.38	-1.21	-0.16	*	6.66
38	0.53	-1.39	-1.02	*	*	61.79
39	1.04	-1.03	3.03	*	*	59.84
40	0.68	-0.20	-1.11	-0.56	*	31.09
41	1.22	-1.68	-2.66	*	*	21.82
46	1.29	-1.30		*	*	-0.11
47	1.42	-0.14	0.61	*	*	51.43
48	1.59	-0.16		*	*	11.77
49	0.82	0.33	-1.12	-0.84	0.00	55.33
120	0.53	-0.36	-0.57	-0.18	0.17	1.12
121	0.97	-1.10	0.82	*	*	18.37
122	0.72	0.02	0.85	1.47	1.76	25.16
123	0.77	0.18	-2.03	2.42	1.74	19.86

[1] Constructed-response item parameters are in the 2PPC metric.

* Does not apply

Seventh Grade Writing

The critical Z value for the 2000 seventh grade Writing assessment, based on the calibration sample, is Z = 89.4. Fit values above this critical value may indicate poor model fit. The item parameters and fit statistics for the multiple-choice and constructed response items are shown in Tables 30 and 31, respectively. The Z-statistics for all MC items and most CR items are small compared to the critical Z-value indicating that the proportions of students with each item score are close to the proportions that would be predicted by the estimated thetas and item parameters.

Items 71 and 97, both constructed-response items, exhibited Z-statistics (item 71, Z=92.5 and item 97, Z=367.2) greater than the critical Z-value indicating less than optimal fit. The ICC for the items indicated that the student responses fit the model reasonably well with slight misfit in parts of the ability continuum where the numbers

of cases are relatively small. A close examination of the ICRFs and fit for item 71 indicated that the proportion of lower ability students obtaining a 0 and a 1 is less than expected. The student responses for other score levels fitted reasonably well to the model except some "Fish-hooks". For item 97, the proportion of lower to middle ability students obtaining a 0 is lower than expected and obtaining a 1 is higher than expected. The proportion of higher ability students obtaining a 4 is slightly higher than expected.

Table 30. Item Parameter and Fit Summary[1], Multiple-Choice Items, Grade 7, Writing (N=33,523)

Multiple-Choice Items									
Book Item #	a	b	c	Fit-Z	Book Item #	a	b	c	Fit-Z
53	0.72	-1.62	0.20	-0.51	76	1.06	-0.65	0.22	1.04
54	0.53	0.92	0.20	8.79	77	0.69	-2.15	0.00	8.45
55	0.95	0.54	0.40	4.56	78	0.54	-1.69	0.00	10.86
56	0.98	0.55	0.17	7.86	79	0.64	0.10	0.25	0.09
57	0.90	1.03	0.27	2.66	80	0.67	-1.43	0.20	19.47
58	0.89	0.31	0.30	2.13	81	0.66	0.97	0.49	2.46
60	0.75	-2.89	0.20	5.33	82	0.81	-2.90	0.20	3.51
61	0.54	-1.20	0.12	1.76	83	0.55	-2.50	0.20	8.38
62	0.93	-1.11	0.17	34.35	84	0.54	-1.44	0.00	44.38
63	0.62	-1.78	0.20	22.54	85	1.08	-1.26	0.16	3.06
64	0.62	1.02	0.37	2.33	86	0.78	0.21	0.15	6.70
65	0.64	-1.87	0.00	1.12	87	1.06	-0.36	0.23	8.08
66	0.72	0.48	0.19	6.16	88	0.96	-0.49	0.14	7.93
67	0.70	-0.71	0.15	0.09	89	1.00	0.48	0.15	12.96
68	0.95	-1.83	0.13	2.61	90	0.77	-1.30	0.09	1.36
69	0.73	-1.09	0.20	4.89	91	0.74	-1.10	0.16	-0.09
70	0.87	-0.98	0.26	0.86	92	1.12	-1.41	0.30	3.36
72	0.82	-0.21	0.19	0.32	93	0.92	-0.41	0.19	8.45
73	0.73	0.14	0.23	-0.47	94	0.84	0.28	0.14	12.08
74	0.47	1.39	0.14	1.61	95	0.82	1.29	0.12	21.73
75	0.93	0.24	0.18	8.82	96	0.46	0.56	0.20	15.80

[1]Multiple Choice item parameters are in the 3PL metric.

Table 31. Item Parameter and Fit Summary[1], Constructed-Response Items, Grade 7. Writing (N=33,523)

Constructed-Response Items						
Book Item #	r	a1	a2	a3	a4	Fit-Z
1	0.61	-4.59	*	*	*	0.70
1A	1.04	-1.08	*	*	*	14.25
1B	1.27	-2.33	*	*	*	4.23
1C	1.30	-3.71	*	*	*	3.97
1D	0.97	-4.39	*	*	*	3.92
1E	1.21	-2.92	*	*	*	7.42
1F	1.02	-2.09	*	*	*	3.16
2A	0.85	-2.82	-1.72	-0.24	1.58	49.33
2B	1.25	-5.69	-2.72	-0.32	2.06	8.28
2C	1.33	-4.98	-1.40	*	*	5.37
27	0.88	-1.75	-2.11	0.26	2.15	45.29
59A	1.10	-1.22	*	*	*	3.24
59B	0.89	3.79	*	*	*	5.37
59C	0.93	-0.20	*	*	*	11.81
59D	0.76	-1.81	*	*	*	21.44
71	1.10	-2.40	-2.48	-0.32	2.19	92.48
97	0.89	-2.40	-2.66	-0.25	2.02	387.23

[1] Constructed-response item parameters are in the 2PPC metric.

* Does not apply

Eighth Grade Mathematics

The critical Z value for the 2000 eighth grade Mathematics assessment, based on the calibration sample, is Z = 132.3. Fit values above this critical value may indicate poor model fit. The item parameters and fit statistics for the multiple-choice and constructed response items are shown in Tables 32 and 33, respectively. The Z-statistics for all CR items and most MC items are smaller than the critical Z-value indicating that the proportions of students with each item score are close to the proportions that would be predicted by the estimated thetas and item parameters.

Item 29, a multiple-choice item, exhibited a less than optimal fit with a Z-statistic of 142.3. A close examination of the detailed fit of item 29 indicated that the proportion of lower ability students obtaining a 1 is higher than expected, and lower-middle ability students obtaining a 1 is lower than expected. Note that item 29 is a relatively high discriminating (a=1.76) and difficult (p=0.35) item.

Table 32. Item Parameter and Fit Summary[1], Multiple-Choice Items, Grade 8, Mathematics (N=49,620)

Multiple-Choice Items									
Book Item #	a	b	c	Fit-Z	Book Item #	a	b	c	Fit-Z
1	0.60	-2.00	0.00	7.4	30	1.72	0.30	0.26	32.6
2	0.72	-0.75	0.21	11.7	31	1.18	-0.76	0.16	2.4
3	0.17	1.22	0.20	5.2	32	0.89	0.46	0.21	0.2
4	0.94	0.15	0.05	1.1	34	0.34	-0.53	0.20	77.9
5	1.10	0.06	0.22	14.6	35	0.65	0.45	0.17	3.1
7	1.24	0.18	0.22	3.5	37	1.47	0.56	0.15	5.9
8	1.09	0.67	0.39	1.7	38	0.88	-0.20	0.45	1.5
9	0.89	0.62	0.04	3.4	41	0.58	0.37	0.15	10.7
10	0.59	-0.61	0.08	2.3	42	0.27	-1.23	0.20	24.9
12	0.50	-0.63	0.13	2.9	43	1.57	0.31	0.18	12.6
13	0.74	0.58	0.17	2.2	44	1.43	1.33	0.20	109.5
14	0.64	-1.55	0.08	5.4	45	0.94	0.17	0.03	9.3
15	1.22	0.57	0.19	2.5	46	0.78	-0.55	0.34	6.7
17	0.60	-1.95	0.20	9.3	47	0.74	0.04	0.23	3.3
18	0.39	-0.28	0.08	9.9	49	0.44	-2.26	0.20	27.2
21	1.13	0.32	0.26	2.7	50	0.83	-0.36	0.27	11.0
22	0.49	-0.16	0.00	12.8	51	0.56	-2.15	0.20	15.2
23	1.36	0.82	0.16	31.5	52	1.02	-0.08	0.18	1.5
24	0.92	1.41	0.05	3.1	54	1.57	0.54	0.33	14.1
25	0.64	-0.30	0.16	3.1	55	1.08	-0.34	0.37	1.7
26	1.56	1.81	0.13	37.5	57	1.42	0.59	0.10	32.0
27	0.57	-0.86	0.07	1.2	58	0.54	-1.65	0.20	19.1
29	1.78	0.91	0.18	142.3					

[1] Multiple Choice item parameters are in the 3PL metric.

Table 33. Item Parameter and Fit Summary[1], Constructed-Response Items, Grade 8, Mathematics (N=49,620)

Constructed-Response Items						
Book Item #	f	d1	d2	d3	d4	Fit-Z
6	1.47	-0.95	1.25	*	*	40.0
11	1.44	0.97	1.48	*	*	48.1
16	0.90	-2.62	-0.06	*	*	46.1
19	0.94	0.51	-0.40	*	*	3.3
20	0.83	-0.03	-0.93	0.75	-0.19	81.4
28	0.88	-1.23	-1.28	*	*	68.4
33	0.81	0.30	0.63	*	*	68.6
36	1.06	-0.43	0.11	*	*	25.6
39	0.74	1.80	-0.95	*	*	38.3
40	1.11	-1.62	-0.52	0.95	1.99	27.5
48	1.25	-1.29	-0.59	*	*	46.4
53	0.78	-1.40	0.01	*	*	25.1
56	0.85	-0.42	1.42	*	*	34.3
59	1.32	-2.04	-0.25	*	*	11.2
60	0.96	-0.57	-0.08	1.06	0.74	48.9

[1] Constructed-response item parameters are in the 2PPC metric.

* Does not apply

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Eighth Grade Science

The critical Z value for the 2000 eighth grade Science assessment, based on the calibration sample, is Z = 133.2. Fit statistics above this critical value may indicate poor model fit. The item parameters and fit statistics for the multiple-choice and constructed response items are shown in Tables 34 and 35, respectively. The Z-statistics for most MC and CR items are smaller than the critical Z-value except for items 4, 10, and 61. The smaller Z-statistics suggest that the proportions of students with each item score are close to the proportions that would be predicted by the estimated thetas and item parameters for most items. Items 4 and 10, both MC, and 61, a CR item, however showed less than optimal fit with z-statistics of 848.4, 137.3, and 156.1, respectively.

The ICC for item 4 is relatively flat which indicates that the proportion of students obtaining a 1 is similar for students across the range of ability (Note that item 4 is not a highly discriminating item; a = 0.12). A detailed examination of the fit showed that the proportion of low to middle ability students obtaining a 1 was higher than expected and the proportion of middle to high ability students obtaining a 1 was lower than expected. The ICC for item 10 also was somewhat flat except for students of high ability (Note that item 10 is also not a highly discriminating item; a=0.12). A close examination of the detailed fit of the responses indicated that the proportion of low to middle ability students obtaining a 1 was higher than expected and middle to high ability level students obtaining a 1 was lower than expected. Because items 4 and 10 showed such poor fit to the IRT model, had such low discrimination parameters, and had negative point bi-serial coefficients, they were dropped from the operational test results.

The ICC for item 61 showed that the item responses fit the model reasonably well. A close examination of the detailed fit of the responses in each category indicated that the proportion of lower ability students obtaining a 0 was lower than expected. Similarly, the proportion of lower to middle ability students obtaining a 1 was higher

than expected and middle to higher ability students was slightly lower than expected. In fact, the item response is flat for this category indicating that all ability level students have a similar chance of obtaining a 1. Note that item 61 is a relatively low discriminating (a=0.49) but difficult (p=0.38) item. Because the item responses fitted the IRT model reasonably well and had no undesirable characteristics of item parameters, item 61 was retained for the operational test results.

Table 34. Item Parameter and Fit Summary[1], Multiple-Choice Items, Grade 8, Science (N=49,955)

Multiple-Choice Items									
Book Item #	a	b	c	Fit-Z	Book Item #	a	b	c	Fit-Z
1	0.48	1.58	0.28	11.61	41	0.94	0.26	0.24	3.72
2	1.17	-0.33	0.49	5.41	43	1.06	-0.59	0.13	2.53
3	0.79	1.63	0.18	2.78	44	0.73	0.47	0.17	3.26
4*	0.12	1.22	0.20	848.40	45	1.25	0.60	0.48	19.39
5	0.78	-1.14	0.20	2.15	46	0.82	-0.78	0.08	-1.02
6	0.72	-0.94	0.17	0.27	47	0.77	-0.28	0.16	6.74
7	0.53	0.40	0.10	2.50	48	0.86	0.18	0.16	11.15
8	1.06	-0.83	0.47	3.81	49	0.94	-2.15	0.20	6.84
9	1.09	-1.01	0.31	2.05	50	0.86	-0.21	0.33	0.04
10*	0.12	1.38	0.20	137.27	51	0.82	0.98	0.26	1.69
11	0.79	-0.45	0.23	1.98	52	0.46	-1.08	0.20	13.75
12	0.54	-0.38	0.32	5.80	54	1.07	-0.62	0.15	2.92
13	0.89	-0.35	0.28	3.54	55	0.50	-1.54	0.20	2.16
14	0.84	0.34	0.33	1.81	56	0.70	-0.24	0.42	10.74
15	0.91	0.85	0.15	3.03	57	1.18	-2.04	0.15	7.92
16	0.89	0.44	0.26	9.03	58	0.39	1.95	0.23	4.39
17	0.70	-1.83	0.13	5.48	59	0.50	-1.96	0.00	25.01
18	0.78	-0.66	0.25	1.03	60	1.48	1.79	0.16	38.76
19	0.54	0.37	0.21	2.64	62	0.76	-0.47	0.34	3.31
26	0.67	-2.11	0.20	7.39	63	0.62	0.36	0.26	2.51
27	1.09	-0.24	0.27	4.80	65	0.57	-1.08	0.00	22.09
28	0.63	-0.93	0.00	14.52	66	0.64	0.27	0.30	5.54
30	0.95	0.83	0.12	8.59	67	0.85	-0.40	0.29	3.71
32	0.90	0.58	0.27	6.52	68	1.14	0.22	0.22	9.33
33	0.78	-1.82	0.20	14.86	70	0.84	-1.36	0.20	10.89
34	0.77	-1.88	0.20	9.00	71	1.06	-0.81	0.19	1.26
37	0.84	-0.87	0.30	0.63	72	0.56	-2.48	0.00	4.40
38	1.26	1.23	0.26	13.17	73	0.75	-1.44	0.30	5.44
39	0.94	-0.36	0.26	0.88	74	0.67	-0.51	0.18	1.15
40	0.83	-0.14	0.19	1.74	75	0.85	-0.92	0.40	3.52

[1]Multiple Choice item parameters are in the 3PL metric.

*Items 4 and 10 were removed from the operational test form.

Table 35. Item Parameter and Fit Summary[1], Constructed-Response Items. Grade 8. Science (N=49,955)

Constructed-Response Items						
Book Item #	f	a1	a2	a3	a4	Fit-Z
20	0.70	-0.67	-0.21	*	*	26.08
21	0.65	-0.80	0.80	2.27	*	47.97
22	1.27	-1.25	*	*	*	32.88
23	0.67	-2.07	-1.44	-0.42	*	18.05
24	0.48	0.88	-0.63	-0.31	0.46	69.54
25	0.93	-1.47	-0.60	*	*	32.68
29	0.79	-0.63	*	*	*	10.95
31	0.51	1.11	2.11	*	*	5.63
35	0.88	0.18	1.48	2.23	*	8.96
36	0.81	-1.95	-0.82	*	*	58.27
42	0.77	0.37	*	*	*	3.24
53	0.58	0.29	-1.27	*	*	74.10
61	0.49	1.56	-0.93	*	*	156.11
64	1.18	-2.72	1.47	1.66	*	11.83
69	0.70	0.39	*	*	*	66.90

[1] Constructed-response item parameters are in the 2PPC metric.

* Does not apply

Procedures for Detecting and Reducing Bias in CSAP

Four procedures were used to reduce bias in Colorado Student Assessment. The first procedure is based on the premise that careful editorial attention to validity is an essential step in keeping bias to a minimum. Bias can occur only if the test is measuring different things for different groups. If the test entails irrelevant skills or knowledge (however common), the possibility of bias is increased. Thus, careful attention is paid to content validity.

The second step is to follow the McGraw-Hill guidelines designed to reduce or eliminate bias. Item writers are directed to the following published guidelines: *Guidelines for Bias-Free Publishing* (McGraw-Hill, 1983) and *Reflecting Diversity: Multicultural Guidelines for Educational Publishing Professionals* (Macmillan/McGraw-Hill, 1993). Developers review the materials with these considerations in mind.

In the third procedure, educational professionals and community members in the state who represent various gender and ethnic groups review all tryout materials. They are asked to consider and comment on the appropriateness of language, subject matter, and representation of people.

It is believed that these three procedures both improve the quality of *CSAP* and reduce Bias. Current evidence, however, suggests that expertise in this area is no substitute for data; reviewers are often wrong about which items work to the disadvantage of a group, apparently because some of their ideas about how students will react to items may be faulty (Sandoval & Mille, 1980; Jensen, 1980; Scheuneman, 1987).

The fourth procedure, an empirical approach, involves statistical procedures referred to as differential item functioning (DIF) analyses.

Differential Item Functioning Analyses

Because the contents were scored using item response theory, the appropriate procedure for examining DIF is one that reflects that use. A procedure suggested by Linn and Harnisch (1981) was used for the *CSAP* DIF studies.

An example of this procedure for gender bias analyses follows. The parameters for each item (a_i, b_i, and c_i) and the trait or scale score (θ) for each examinee are estimated for the three-parameter logistic model:

$$P_{ij}(\theta) = c_i + \frac{1-c_i}{1+\exp\left[-1.7a_i\,(\theta_j - b_i)\right]},$$

where $P_{ij}(\theta)$ is the probability that examinee j, with a given value of θ, will obtain a correct score on item i. Note that the item parameter estimates are based on data from the total sample of valid examinees. The sample is then divided into gender groups, and the members in each group are sorted into ten equal score categories (deciles) based upon their location on the score scale (θ). The expected proportion correct for each group based on the model prediction is compared to the observed (actual) proportion correct obtained by the group.

The proportion of people in decile g who are expected to answer item i correctly is

$$P_{ig} = P_{ig}(\theta) = \frac{1}{n_g}\sum_{j \in g} P_{ij}(\theta),$$

where n_g is the number of examinees in decile g. To compute the proportion of students expected to answer item i correctly (over all deciles) for a group (e.g., Female) the formula is given by:

$$P_{i.} = P_i(\theta)_. = \frac{\sum_{g=1}^{10} n_g P_{ig}(\theta)}{\sum_{g=1}^{10} n_g}.$$

The corresponding observed proportion correct for examinees in a decile (O_{ig}) is the number of examinees in decile g who answered item i correctly divided by the number of people in the decile (n_g). That is,

$$O_{ig} = \frac{\sum_{j \in g} u_{ij}}{n_g},$$

where u_{ij} is the dichotomous score for item i for examinee j.

The corresponding formula to compute the observed proportion answering each item correctly (over all deciles) for a complete gender group is given by:

$$O_{i.} = \frac{\sum_{g=1}^{10} n_g O_{ig}}{\sum_{g=1}^{10} n_g}.$$

After the values are calculated for these variables, the difference between the observed proportion correct (for gender) and expected proportion correct can be computed. The decile group difference (D_{ig}) for observed and expected proportion correctly answering item i in decile g is

$$D_{ig} = O_{ig} - P_{ig}.$$

and the overall group difference (D_i) between observed and expected proportion correct for item i in the complete group (over all deciles) is

$$D_{i.} = O_{i.} - P_{i.}.$$

These indices are indicators of the degree to which members of gender groups perform better or worse than expected on each item, based on the parameter estimates from all sub-samples. Differences for decile groups provide an index for each of the ten regions on the score (θ) scale. The decile group difference (D_{ig}) can be either positive or negative. Use of the decile group differences as well as the overall group difference allows one to detect items that give a large positive difference in one range of θ and a large negative difference in another range of θ, yet have a small overall difference.

A generalization of the Linn and Harnisch (1981) procedure was used to measure DIF for constructed-response items.

Differential Item Functioning Ratings

The DIF is defined in terms of the decile group and total target sub-sample differences, the D_{i-} (sum of the negative group differences) and D_{i+} (sum of the positive group differences) values, and the corresponding standardized difference (Z_i) for the sub-sample (see Linn and Harnisch, 1981, p. 112).

Items for which $|D_i| \geq 0.10$ and $|Z_i| \geq 2.58$ are identified as possibly biased. If D_i is positive, the item is functioning differentially in favor of the target sub-sample. If D_i is negative, the item is functioning differentially against the target sub-sample.

Results of the Differential Item Functioning Analyses

The DIF analyses were conducted for all grades and content areas for African Americans, Hispanics, Males, and Females. Detailed results of the analyses appear in Appendix B.

Third Grade Reading

No items indicated DIF in favor or disfavor of any specified group in the 2000 third grade Reading CSAP assessment.

Fourth Grade Reading

Two items, both CR, indicated signs of DIF towards the African American students with one against and another in favor of them.

Fourth Grade Writing

No items indicated DIF in favor or disfavor of any specified group in the 2000 fourth grade Writing CSAP assessments.

Seventh Grade Reading

One CR item indicated a sign of DIF against Males.

Three items, all CR, exhibited DIF towards the African American students with two against and one in favor of them.

One CR item exhibited DIF in favor of Hispanic students.

Seventh Grade Writing

Two items, both CR exhibited DIF in favor of African American students.

Eighth Grade Mathematics

Two items, both CR, exhibited DIF in the 2000 eighth grade Mathematics assessment—one in favor of and another against the Males. The same items exhibited DIF for Females but in reverse order. The item that exhibited DIF in favor of Males exhibited DIF against Females and the one exhibited DIF against Males exhibited DIF in favor of Females. Note that both items are relatively difficult.

Eighth Grade Science

Two items, both CR, exhibited DIF in the 2000 eighth grade Science assessment—both against the Males. The same items also exhibited DIF in favor of Females.

One CR item in grade 8 Science exhibited DIF against African American students.

Standard Errors

Measurement error is associated with every test score. A student's true score is the hypothetical average score that would result if the test could be administered repeatedly without the effects of practice or fatigue. The standard error of measurement (SEM) can be used to obtain a range within which a student's true score is likely to fall. The fact that the score for a single test may not represent an individual's true status gives rise to the need for the standard error.

For example, an obtained score should be regarded not as an absolute value but as a point within a range that probably includes a student's true score. It is expected that 68% of the time a student's score obtained from a single testing would fall within

one SEM of that student's true score and that 95% of the time the obtained score would fall within two standard errors of the true score.

An overall standard error of measurement can be estimated using the classical test theory formula: $SEM = S_Y\sqrt{(1-r)}$, where S_Y is the test standard deviation, and r is the reliability of the assessment. Using this formula yields the standard errors for different grades and content areas shown in Table 36. Tables 37 - 43 provide estimates, based on item response theory, of standard errors for selected scale scores for each of the CSAP assessment grades and contents.

Table 36
Classical Test Theory Estimate of Overall Standard Error of Measurement

Assessment	Standard Error of Measurement
Grade 3 Reading	14.63
Grade 4 Reading	12.17
Grade 4 Writing	13.82
Grade 7 Reading	13.12
Grade 7 Writing	15.50
Grade 8 Mathematics	15.08
Grade 8 Science	16.71

Table 37. Scale Score and Associated Standard Errors, Grade 3, Reading

Scale Score	Standard Error	Scale Score	Standard Error
300	101	463	10
345	56	466	10
364	37	469	10
376	28	472	10
385	23	475	10
392	20	478	11
398	18	481	11
403	16	485	11
408	15	488	11
413	14	492	11
417	14	496	12
421	13	500	12
424	13	504	12
428	12	509	13
431	12	514	13
435	12	519	14
438	11	525	15
441	11	532	16
444	11	540	17
448	11	550	20
451	11	562	23
454	11	579	28
457	10	608	42
460	10	700	135

Table 38. Scale Score and Associated Standard Errors, Grade 4, Reading

Scale Score	Standard Error	Scale Score	Standard Error
300	94	470	9
316	78	472	9
338	56	474	9
352	42	476	9
363	34	478	9
372	28	480	9
379	25	482	9
385	22	484	9
391	20	486	9
395	18	488	9
400	17	490	9
404	15	493	10
407	14	495	10
411	14	497	10
414	13	500	10
417	12	502	10
419	12	505	10
422	11	507	11
425	11	510	11
427	11	513	11
429	10	516	11
432	10	519	12
434	10	523	12
436	10	526	12
438	10	530	13
440	10	534	13
442	9	538	14
444	9	543	14
446	9	548	15
448	9	553	16
450	9	559	16
452	9	566	17
453	9	573	19
455	9	582	20
457	9	593	23
459	9	605	26
461	9	622	31
463	9	647	40
465	9	691	61
466	9	720	80
468	9		

Table 39. Scale Score and Associated Standard Errors, Grade 4, Writing

Scale Score	Standard Error	Scale Score	Standard Error
300	79	474	11
327	52	478	11
346	39	481	11
359	32	485	11
371	27	489	12
380	24	493	12
388	22	496	12
395	20	501	12
401	18	505	12
407	17	509	12
412	16	514	13
417	15	518	13
422	15	523	13
426	14	528	14
431	14	534	14
435	13	540	15
439	13	546	15
442	12	553	16
446	12	561	17
450	12	570	19
453	12	581	21
457	12	593	23
460	11	609	27
464	11	630	32
467	11	663	44
471	11	720	83

Table 40. Scale Score and Associated Standard Errors, Grade 7, Reading

Scale Score	Standard Error	Scale Score	Standard Error	Scale Score	Standard Error
300	70	440	11	508	11
303	67	443	11	511	11
320	50	445	11	514	11
333	39	447	10	516	12
343	33	449	10	519	12
352	29	451	10	522	12
359	25	453	10	525	12
365	23	455	10	528	12
371	21	457	10	531	13
376	20	459	10	535	13
380	18	462	10	538	13
385	17	464	10	542	13
389	16	466	10	545	14
392	16	468	10	549	14
396	15	470	10	554	15
399	14	472	10	558	15
403	14	474	10	563	16
406	13	476	10	568	16
409	13	478	10	574	17
411	13	480	10	580	18
414	12	483	10	586	19
417	12	485	10	593	20
419	12	487	10	601	21
422	12	489	10	610	22
424	12	491	10	620	24
427	11	494	11	631	26
429	11	496	11	645	29
431	11	498	11	661	33
434	11	501	11	685	40
436	11	503	11	723	57
438	11	506	11	770	89

Table 41. Scale Score and Associated Standard Errors, Grade 7, Writing

Scale Score	Standard Error	Scale Score	Standard Error
300	48	470	13
307	44	473	13
320	36	477	13
331	31	480	13
341	28	484	13
349	25	488	13
356	23	491	13
363	22	495	13
369	21	499	13
375	19	503	13
380	19	507	13
385	18	511	13
390	17	515	13
395	17	519	13
399	16	524	13
403	16	528	14
407	15	533	14
412	15	538	14
415	15	543	15
419	14	549	15
423	14	555	15
427	14	561	16
431	14	568	17
434	14	575	18
438	13	584	19
441	13	593	21
445	13	605	23
448	13	619	26
452	13	636	30
456	13	661	37
459	13	703	52
463	13	780	101
466	13		

Table 42. Scale Score and Associated Standard Errors, Grade 8, Mathematics

Scale Score	Standard Error	Scale Score	Standard Error
300	83	505	11
318	65	508	11
338	51	510	11
353	42	513	11
365	36	515	11
376	32	518	11
385	29	520	11
393	26	523	11
400	24	525	11
407	23	528	11
413	21	531	11
419	20	533	11
424	19	536	11
429	18	539	11
434	18	542	11
438	17	544	11
443	16	547	11
447	16	551	12
451	15	554	12
454	15	557	12
458	15	561	12
461	14	564	13
465	14	568	13
468	14	572	14
471	13	577	14
474	13	581	15
477	13	587	16
480	13	592	16
483	12	599	18
486	12	607	19
489	12	616	22
492	12	627	25
494	12	642	31
497	11	665	41
500	11	709	67
502	11	760	113

Table 43. Scale Score and Associated Standard Errors, Grade 8, Science

Scale Score	Standard Error	Scale Score	Standard Error
300	71	493	13
318	55	496	13
331	45	499	13
342	39	502	13
352	34	506	14
360	31	509	14
368	28	512	14
375	26	515	14
381	24	519	14
387	23	522	14
392	22	526	14
397	21	529	14
402	20	533	14
407	19	537	14
411	19	541	15
416	18	545	15
420	18	549	15
424	17	553	15
428	17	557	16
431	16	562	16
435	16	567	16
439	16	572	17
442	15	577	17
446	15	582	18
449	15	588	18
452	15	595	19
456	14	602	20
459	14	609	21
462	14	618	23
465	14	628	25
468	14	639	28
471	14	653	32
474	14	671	37
477	14	694	44
481	14	728	56
484	13	788	83
487	13	790	84
490	13		

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Appendix A-1. Frequency Distribution of Scale Scores. Grade 3. English. Reading. All Students

Scale Scores	Frequency	Percent	Cumulative Frequency	Cumulative Percent	Scale Scores	Frequency	Percent	Cumulative Frequency	Cumulative Percent
300	49	0.09	49	0.09	378	16	0.03	330	0.62
317	1	0.00	50	0.09	379	14	0.03	344	0.65
323	1	0.00	51	0.10	380	15	0.03	359	0.68
332	1	0.00	52	0.10	381	13	0.02	372	0.70
335	1	0.00	53	0.10	382	16	0.03	388	0.73
336	1	0.00	54	0.10	383	15	0.03	403	0.76
337	1	0.00	55	0.10	384	16	0.03	419	0.79
339	1	0.00	56	0.11	385	24	0.05	443	0.84
340	2	0.00	58	0.11	386	19	0.04	462	0.87
342	3	0.01	61	0.12	387	30	0.06	492	0.93
343	4	0.01	65	0.12	388	26	0.05	518	0.98
345	2	0.00	67	0.13	389	21	0.04	539	1.02
346	3	0.01	70	0.13	390	28	0.05	567	1.07
347	3	0.01	73	0.14	391	23	0.04	590	1.11
348	5	0.01	78	0.15	392	27	0.05	617	1.16
349	4	0.01	82	0.15	393	35	0.07	652	1.23
350	5	0.01	87	0.16	394	24	0.05	676	1.27
351	4	0.01	91	0.17	395	28	0.05	704	1.33
352	3	0.01	94	0.18	396	31	0.06	735	1.39
353	5	0.01	99	0.19	397	38	0.07	773	1.46
354	5	0.01	104	0.20	398	34	0.06	807	1.52
355	6	0.01	110	0.21	399	45	0.08	852	1.61
356	6	0.01	116	0.22	400	34	0.06	886	1.67
357	13	0.02	129	0.24	401	48	0.09	934	1.76
358	7	0.01	136	0.26	402	41	0.08	975	1.84
359	5	0.01	141	0.27	403	45	0.08	1020	1.92
360	7	0.01	148	0.28	404	43	0.08	1063	2.00
361	2	0.00	150	0.28	405	54	0.10	1117	2.11
362	11	0.02	161	0.30	406	44	0.08	1161	2.19
363	8	0.02	169	0.32	407	54	0.10	1215	2.29
364	11	0.02	180	0.34	408	62	0.12	1277	2.41
365	8	0.02	188	0.35	409	51	0.10	1328	2.50
366	5	0.01	193	0.36	410	51	0.10	1379	2.60
367	11	0.02	204	0.38	411	55	0.10	1434	2.70
368	8	0.02	212	0.40	412	58	0.11	1492	2.81
369	13	0.02	225	0.42	413	60	0.11	1552	2.93
370	10	0.02	235	0.44	414	57	0.11	1609	3.03
371	11	0.02	246	0.46	415	63	0.12	1672	3.15
372	8	0.02	254	0.48	416	69	0.13	1741	3.28
373	9	0.02	263	0.50	417	95	0.18	1836	3.46
374	9	0.02	272	0.51	418	66	0.12	1902	3.59
375	9	0.02	281	0.53	419	66	0.12	1968	3.71
376	17	0.03	298	0.56	420	91	0.17	2059	3.88
377	16	0.03	314	0.59	421	76	0.14	2135	4.03

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Scale Scores	Frequency	Percent	Cumulative Frequency	Cumulative Percent	Scale Scores	Frequency	Percent	Cumulative Frequency	Cumulative Percent
422	74	0.14	2209	4.17	466	305	0.58	9951	18.77
423	73	0.14	2282	4.30	467	318	0.60	10269	19.37
424	73	0.14	2355	4.44	468	370	0.70	10639	20.07
425	85	0.16	2440	4.60	469	313	0.59	10952	20.66
426	83	0.16	2523	4.76	470	310	0.58	11262	21.24
427	107	0.20	2630	4.96	471	371	0.70	11633	21.94
428	90	0.17	2720	5.13	472	355	0.67	11988	22.61
429	97	0.18	2817	5.31	473	311	0.59	12299	23.20
430	88	0.17	2905	5.48	474	406	0.77	12705	23.96
431	113	0.21	3018	5.69	475	353	0.67	13058	24.63
432	116	0.22	3134	5.91	476	381	0.72	13439	25.35
433	123	0.23	3257	6.14	477	404	0.76	13843	26.11
434	134	0.25	3391	6.40	478	381	0.72	14224	26.83
435	130	0.25	3521	6.64	479	428	0.81	14652	27.63
436	119	0.22	3640	6.87	480	425	0.80	15077	28.44
437	131	0.25	3771	7.11	481	438	0.83	15515	29.26
438	126	0.24	3897	7.35	482	424	0.80	15939	30.06
439	157	0.30	4054	7.65	483	409	0.77	16348	30.83
440	167	0.31	4221	7.96	484	474	0.89	16822	31.73
441	129	0.24	4350	8.20	485	456	0.86	17278	32.59
442	143	0.27	4493	8.47	486	487	0.92	17765	33.51
443	173	0.33	4666	8.80	487	450	0.85	18215	34.35
444	165	0.31	4831	9.11	488	504	0.95	18719	35.31
445	178	0.34	5009	9.45	489	495	0.93	19214	36.24
446	158	0.30	5167	9.75	490	551	1.04	19765	37.28
447	181	0.34	5348	10.09	491	490	0.92	20256	38.20
448	198	0.37	5546	10.46	492	445	0.84	20700	39.04
449	197	0.37	5743	10.83	493	508	0.96	21208	40.00
450	180	0.34	5923	11.17	494	509	0.96	21717	40.96
451	216	0.41	6139	11.58	495	526	0.99	22243	41.95
452	223	0.42	6362	12.00	496	505	0.95	22748	42.90
453	207	0.39	6569	12.39	497	493	0.93	23241	43.83
454	245	0.46	6814	12.85	498	529	1.00	23770	44.83
455	207	0.39	7021	13.24	499	548	1.03	24318	45.87
456	228	0.43	7249	13.67	500	516	0.97	24834	46.84
457	232	0.44	7481	14..	501	537	1.01	25371	47.85
458	239	0.45	7720	14.56	502	541	1.02	25912	48.87
459	254	0.48	7974	15.04	503	561	1.06	26473	49.93
460	253	0.48	8227	15.52	504	536	1.01	27009	50.94
461	261	0.49	8488	16.01	505	542	1.02	27551	51.96
462	272	0.51	8760	16.52	506	498	0.94	28049	52.90
463	274	0.52	9034	17.04	507	548	1.03	28597	53.94
464	312	0.59	9346	17.63	508	561	1.06	29158	54.99
465	300	0.57	9646	18.19	509	576	1.09	29734	56.08

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Scale Scores	Frequency	Percent	Cumulative Frequency	Cumulative Percent	Scale Scores	Frequency	Percent	Cumulative Frequency	Cumulative Percent
510	499	0.94	30233	57.02	554	260	0.49	48341	91.18
511	569	1.07	30802	58.10	555	237	0.45	48578	91.62
512	592	1.12	31394	59.21	556	215	0.41	48793	92.03
513	560	1.06	31954	60.27	557	176	0.33	48969	92.36
514	498	0.94	32452	61.21	558	142	0.27	49111	92.63
515	478	0.90	32930	62.11	559	155	0.29	49266	92.92
516	563	1.06	33493	63.17	560	212	0.40	49478	93.32
517	564	1.06	34057	64.23	561	185	0.35	49663	93.67
518	472	0.89	34529	65.12	562	239	0.45	49902	94.12
519	512	0.97	35041	66.09	563	108	0.20	50010	94.32
520	528	1.00	35569	67.09	564	143	0.27	50153	94.59
521	523	0.99	36092	68.07	565	60	0.11	50213	94.71
522	467	0.88	36559	68.95	566	104	0.20	50317	94.90
523	490	0.92	37049	69.88	567	128	0.24	50445	95.14
524	442	0.83	37491	70.71	568	123	0.23	50568	95.36
525	490	0.92	37981	71.64	569	240	0.45	50808	95.83
526	472	0.89	38453	72.53	570	113	0.21	50921	96.04
527	506	0.95	38959	73.48	571	38	0.07	50959	96.11
528	438	0.83	39397	74.31	572	71	0.13	51030	96.25
529	447	0.84	39844	75.15	573	45	0.08	51075	96.33
530	466	0.88	40310	76.03	574	66	0.12	51141	96.46
531	423	0.80	40733	76.83	575	119	0.22	51260	96.68
532	430	0.81	41163	77.64	576	39	0.07	51299	96.75
533	402	0.76	41565	78.39	577	99	0.19	51398	96.94
534	399	0.75	41964	79.15	578	105	0.20	51503	97.14
535	412	0.78	42376	79.92	579	36	0.07	51539	97.21
536	423	0.80	42799	80.72	580	7	0.01	51546	97.22
537	372	0.70	43171	81.42	581	43	0.08	51589	97.30
538	358	0.68	43529	82.10	582	37	0.07	51626	97.37
539	407	0.77	43936	82.87	583	11	0.02	51637	97.39
540	362	0.68	44298	83.55	584	48	0.09	51685	97.48
541	336	0.63	44634	84.18	585	93	0.18	51778	97.66
542	347	0.65	44981	84.84	586	99	0.19	51877	97.84
543	360	0.68	45341	85.52	587	40	0.08	51917	97.92
544	276	0.52	45617	86.04	588	28	0.05	51945	97.97
545	299	0.56	45916	86.60	589	127	0.24	52072	98.21
546	353	0.67	46269	87.27	590	30	0.06	52102	98.27
547	293	0.55	46562	87.82	591	44	0.08	52146	98.35
548	288	0.54	46850	88.36	592	3	0.01	52149	98.36
549	196	0.37	47046	88.73	593	7	0.01	52156	98.37
550	287	0.54	47333	89.27	594	31	0.06	52187	98.43
551	277	0.52	47610	89.80	595	26	0.05	52213	98.48
552	293	0.55	47903	90.35	596	1	0.00	52214	98.48
553	178	0.34	48081	90.68	597	19	0.04	52233	98.52

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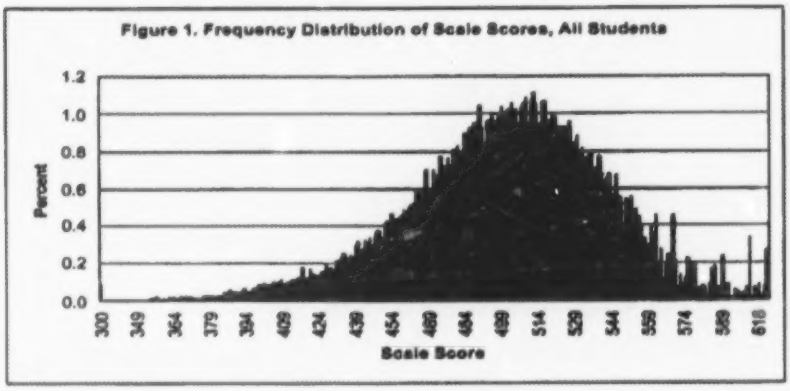
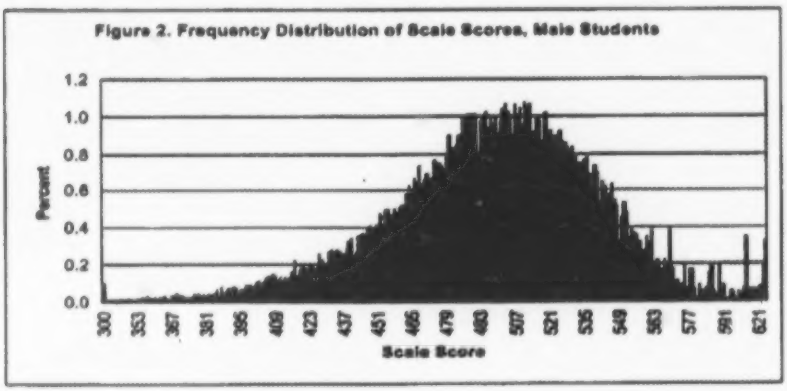
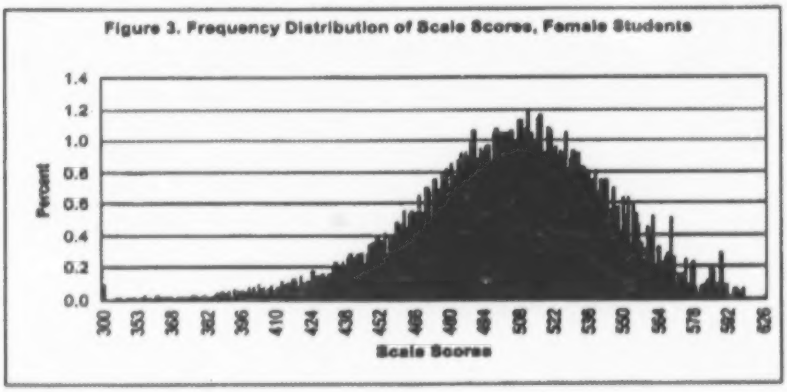
Scale Scores	Frequency	Percent	Cumulative Frequency	Cumulative Percent	Scale Scores	Frequency	Percent	Cumulative Frequency	Cumulative Percent
599	22	0.04	52255	98.56	618	44	0.08	52596	99.20
600	39	0.07	52294	98.63	621	17	0.03	52613	99.23
601	179	0.34	52473	98.97	625	42	0.08	52655	99.31
602	6	0.01	52479	98.98	626	140	0.26	52795	99.58
604	38	0.07	52517	99.05	700	225	0.42	53020	100.00
615	35	0.07	52552	99.12					

Figures 1 – 3. Frequency Distributions of Scale Scores: Grade 3, Reading







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Appendix A-2. Frequency Distribution of Scale Scores. Grade 4. English. Reading. All Students

Scale Scores	Frequency	Percent	Cumulative Frequency	Cumulative Percent	Scale Scores	Frequency	Percent	Cumulative Frequency	Cumulative Percent
300	159	0.30	159	0.30	347	5	0.01	335	0.63
301	2	0.00	161	0.30	348	6	0.01	341	0.64
302	1	0.00	162	0.30	349	7	0.01	348	0.65
303	3	0.01	165	0.31	350	9	0.02	357	0.67
304	2	0.00	167	0.31	351	5	0.01	362	0.68
305	5	0.01	172	0.32	352	6	0.01	368	0.69
306	2	0.00	174	0.32	353	6	0.01	374	0.70
307	4	0.01	178	0.33	354	2	0.00	376	0.70
308	3	0.01	181	0.34	355	2	0.00	378	0.71
309	4	0.01	185	0.35	356	2	0.00	380	0.71
310	3	0.01	188	0.35	357	6	0.01	386	0.72
311	3	0.01	191	0.36	359	9	0.02	395	0.74
312	5	0.01	196	0.37	360	9	0.02	404	0.75
313	4	0.01	200	0.37	361	8	0.01	412	0.77
314	2	0.00	202	0.38	362	10	0.02	422	0.79
315	4	0.01	206	0.38	363	7	0.01	429	0.80
316	6	0.01	212	0.40	364	7	0.01	436	0.81
317	6	0.01	218	0.41	365	7	0.01	443	0.83
319	5	0.01	223	0.42	366	10	0.02	453	0.85
320	6	0.01	229	0.43	367	11	0.02	464	0.87
322	3	0.01	232	0.43	368	7	0.01	471	0.88
323	3	0.01	235	0.44	369	12	0.02	483	0.90
324	3	0.01	238	0.44	370	9	0.02	492	0.92
325	5	0.01	243	0.45	371	12	0.02	504	0.94
326	4	0.01	247	0.46	372	12	0.02	516	0.96
327	6	0.01	253	0.47	373	10	0.02	526	0.98
328	2	0.00	255	0.48	374	15	0.03	541	1.01
329	4	0.01	259	0.48	375	13	0.02	554	1.03
330	5	0.01	264	0.49	376	18	0.03	572	1.07
331	6	0.01	270	0.50	377	10	0.02	582	1.09
332	8	0.01	278	0.52	378	23	0.04	605	1.13
333	3	0.01	279	0.52	379	14	0.03	619	1.16
334	7	0.01	286	0.53	380	22	0.04	641	1.20
335	3	0.01	289	0.54	381	11	0.02	652	1.22
337	3	0.01	292	0.55	382	13	0.02	665	1.24
338	4	0.01	296	0.55	383	18	0.03	683	1.27
339	1	0.00	297	0.55	384	22	0.04	705	1.32
340	6	0.01	303	0.57	385	19	0.04	724	1.35
341	4	0.01	307	0.57	386	15	0.03	739	1.38
342	3	0.01	310	0.58	387	27	0.05	766	1.43
343	6	0.01	316	0.59	388	19	0.04	785	1.47
344	5	0.01	321	0.60	389	16	0.03	801	1.50
345	3	0.01	324	0.60	390	24	0.04	825	1.54
346	6	0.01	330	0.62	391	20	0.04	845	1.58

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Scale Scores	Frequency	Percent	Cumulative Frequency	Cumulative Percent	Scale Scores	Frequency	Percent	Cumulative Frequency	Cumulative Percent
392	38	0.07	883	1.65	436	115	0.21	3544	6.62
393	25	0.05	908	1.69	437	136	0.25	3680	6.87
394	17	0.03	925	1.73	438	118	0.22	3798	7.09
395	32	0.06	957	1.79	439	122	0.23	3918	7.31
396	31	0.06	988	1.84	440	130	0.24	4048	7.56
397	30	0.06	1018	1.90	441	133	0.25	4181	7.80
398	32	0.06	1050	1.96	442	130	0.24	4311	8.05
399	36	0.07	1086	2.03	443	163	0.30	4474	8.35
400	33	0.06	1119	2.09	444	153	0.29	4627	8.64
401	25	0.05	1144	2.14	445	155	0.29	4782	8.93
402	32	0.06	1176	2.20	446	155	0.29	4937	9.22
403	36	0.07	1212	2.26	447	160	0.30	5097	9.51
404	41	0.08	1253	2.34	448	139	0.26	5236	9.77
405	39	0.07	1292	2.41	449	173	0.32	5409	10.10
406	39	0.07	1331	2.48	450	157	0.29	5566	10.39
407	46	0.09	1377	2.57	451	161	0.30	5727	10.69
408	38	0.07	1415	2.64	452	196	0.37	5923	11.06
409	52	0.10	1467	2.74	453	185	0.35	6108	11.40
410	48	0.09	1515	2.83	454	201	0.38	6309	11.78
411	54	0.10	1569	2.93	455	194	0.36	6503	12.14
412	47	0.09	1616	3.02	456	217	0.41	6720	12.54
413	61	0.11	1677	3.13	457	210	0.39	6930	12.94
414	53	0.10	1730	3.23	458	213	0.40	7143	13.33
415	76	0.14	1806	3.37	459	212	0.40	7355	13.73
416	73	0.14	1879	3.51	460	224	0.42	7579	14.15
417	55	0.10	1934	3.61	461	202	0.38	7781	14.52
418	66	0.12	2000	3.73	462	261	0.49	8042	15.01
419	65	0.12	2065	3.85	463	255	0.48	8297	15.49
420	57	0.11	2122	3.96	464	224	0.42	8521	15.91
421	70	0.13	2192	4.09	465	266	0.50	8787	16.40
422	74	0.14	2266	4.23	466	249	0.46	9036	16.87
423	72	0.13	2338	4.36	467	242	0.45	9278	17.32
424	61	0.11	2399	4.48	468	277	0.52	9555	17.84
425	71	0.13	2470	4.61	469	289	0.54	9844	18.38
426	81	0.15	2551	4.76	470	312	0.58	10156	18.96
427	94	0.18	2645	4.94	471	317	0.59	10473	19.55
428	86	0.16	2731	5.10	472	302	0.56	10775	20.11
429	87	0.16	2818	5.26	473	315	0.59	11090	20.70
430	93	0.17	2911	5.43	474	307	0.57	11397	21.27
431	89	0.17	3000	5.60	475	336	0.63	11733	21.90
432	93	0.17	3093	5.77	476	347	0.65	12080	22.55
433	105	0.20	3198	5.97	477	344	0.64	12424	23.19
434	107	0.20	3305	6.17	478	366	0.68	12790	23.88
435	124	0.23	3429	6.40	479	366	0.68	13156	24.56

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Scale Scores	Frequency	Percent	Cumulative Frequency	Cumulative Percent	Scale Scores	Frequency	Percent	Cumulative Frequency	Cumulative Percent
480	354	0.66	13510	25.22	524	509	0.95	34414	64.24
481	376	0.70	13886	25.92	525	488	0.91	34902	65.15
482	364	0.68	14250	26.60	526	491	0.92	35393	66.07
483	381	0.71	14631	27.31	527	501	0.94	35894	67.00
484	363	0.68	14994	27.99	528	519	0.97	36413	67.97
485	390	0.73	15384	28.72	529	485	0.91	36898	68.88
486	379	0.71	15763	29.43	530	471	0.88	37369	69.76
487	406	0.76	16169	30.18	531	461	0.86	37830	70.62
488	430	0.80	16599	30.99	532	465	0.87	38295	71.49
489	422	0.79	17021	31.77	533	484	0.90	38779	72.39
490	443	0.83	17464	32.60	534	464	0.87	39243	73.26
491	422	0.79	17886	33.39	535	452	0.84	39695	74.10
492	448	0.84	18334	34.22	536	455	0.85	40150	74.95
493	463	0.86	18797	35.09	537	416	0.78	40566	75.73
494	466	0.87	19263	35.96	538	426	0.80	40992	76.52
495	431	0.80	19694	36.76	539	408	0.76	41400	77.28
496	478	0.89	20172	37.66	540	447	0.83	41847	78.12
497	472	0.88	20644	38.54	541	441	0.82	42288	78.94
498	521	0.97	21165	39.51	542	375	0.70	42663	79.64
499	495	0.92	21660	40.43	543	403	0.75	43066	80.39
500	488	0.91	22148	41.34	544	419	0.78	43485	81.17
501	474	0.88	22622	42.23	545	380	0.71	43865	81.88
502	530	0.99	23152	43.22	546	358	0.67	44223	82.55
503	484	0.90	23636	44.12	547	338	0.63	44561	83.18
504	518	0.97	24154	45.09	548	351	0.66	44912	83.84
505	548	1.02	24702	46.11	549	314	0.59	45226	84.42
506	489	0.91	25191	47.02	550	332	0.62	45558	85.04
507	542	1.01	25733	48.04	551	352	0.66	45910	85.70
508	536	1.00	26269	49.04	552	345	0.64	46255	86.34
509	512	0.96	26781	49.99	553	324	0.60	46579	86.95
510	527	0.98	27308	50.98	554	301	0.56	46880	87.51
511	493	0.92	27801	51.90	555	269	0.50	47149	88.01
512	512	0.96	28313	52.85	556	276	0.52	47425	88.53
513	514	0.96	28827	53.81	557	268	0.50	47693	89.03
514	508	0.95	29335	54.76	558	265	0.49	47958	89.52
515	487	0.91	29822	55.67	559	277	0.52	48235	90.04
516	477	0.89	30299	56.56	560	247	0.46	48482	90.50
517	523	0.98	30822	57.54	561	203	0.38	48685	90.88
518	508	0.95	31330	58.48	562	239	0.45	48924	91.33
519	503	0.94	31833	59.42	563	194	0.36	49118	91.69
520	549	1.02	32382	60.45	564	202	0.38	49320	92.07
521	512	0.96	32894	61.40	565	188	0.35	49508	92.42
522	493	0.92	33387	62.32	566	163	0.30	49671	92.72
523	518	0.97	33905	63.29	567	192	0.36	49863	93.08

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Scale Scores	Frequency	Percent	Cumulative Frequency	Cumulative Percent	Scale Scores	Frequency	Percent	Cumulative Frequency	Cumulative Percent
568	180	0.34	50043	93.42	612	30	0.06	53258	99.42
569	161	0.30	50204	93.72	613	20	0.04	53278	99.45
570	152	0.28	50356	94.00	614	15	0.03	53293	99.48
571	184	0.34	50540	94.34	615	17	0.03	53310	99.51
572	143	0.27	50683	94.61	616	9	0.02	53319	99.53
573	131	0.24	50814	94.86	617	14	0.03	53333	99.56
574	131	0.24	50945	95.10	618	12	0.02	53345	99.58
575	132	0.25	51077	95.35	619	10	0.02	53355	99.60
576	122	0.23	51199	95.57	620	4	0.01	53359	99.61
577	125	0.23	51324	95.81	621	17	0.03	53376	99.64
578	119	0.22	51443	96.03	622	18	0.03	53394	99.67
579	109	0.20	51552	96.23	623	8	0.01	53402	99.69
580	104	0.19	51656	96.43	624	6	0.01	53408	99.70
581	94	0.18	51750	96.60	625	6	0.01	53414	99.71
582	82	0.15	51832	96.76	626	7	0.01	53421	99.72
583	124	0.23	51956	96.99	627	8	0.01	53429	99.74
584	83	0.15	52039	97.14	628	9	0.02	53438	99.75
585	109	0.20	52148	97.35	629	7	0.01	53445	99.77
586	85	0.16	52233	97.50	630	10	0.02	53455	99.79
587	69	0.13	52302	97.63	631	6	0.01	53461	99.80
588	71	0.13	52373	97.77	632	4	0.01	53465	99.80
589	63	0.12	52436	97.88	633	5	0.01	53470	99.81
590	54	0.10	52490	97.98	634	5	0.01	53475	99.82
591	66	0.13	52556	98.11	635	3	0.01	53478	99.83
592	40	0.07	52596	98.19	636	1	0.00	53479	99.83
593	56	0.10	52653	98.29	637	3	0.01	53482	99.84
594	57	0.11	52710	98.39	638	7	0.01	53489	99.85
595	44	0.08	52754	98.48	639	5	0.01	53494	99.86
596	51	0.10	52805	98.57	642	6	0.01	53500	99.87
597	41	0.08	52846	98.65	643	6	0.01	53506	99.88
598	31	0.06	52877	98.71	644	3	0.01	53509	99.89
599	30	0.06	52907	98.76	645	4	0.01	53513	99.89
600	45	0.08	52952	98.85	647	3	0.01	53516	99.90
601	35	0.07	52987	98.91	648	3	0.01	53519	99.90
602	35	0.07	53022	98.98	649	1	0.00	53520	99.91
603	32	0.06	53054	99.04	650	2	0.00	53522	99.91
604	25	0.05	53079	99.08	651	1	0.00	53523	99.91
605	23	0.04	53102	99.13	652	1	0.00	53524	99.91
606	17	0.03	53119	99.16	653	5	0.01	53529	99.92
607	19	0.04	53138	99.19	654	5	0.01	53534	99.93
608	30	0.06	53168	99.25	655	1	0.00	53535	99.93
609	17	0.03	53185	99.28	656	1	0.00	53536	99.94
610	25	0.05	53210	99.33	657	1	0.00	53537	99.94
611	18	0.03	53228	99.36	659	6	0.01	53543	99.95

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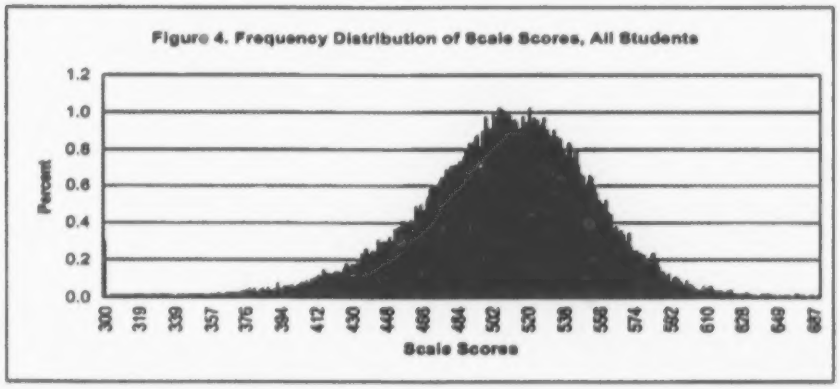
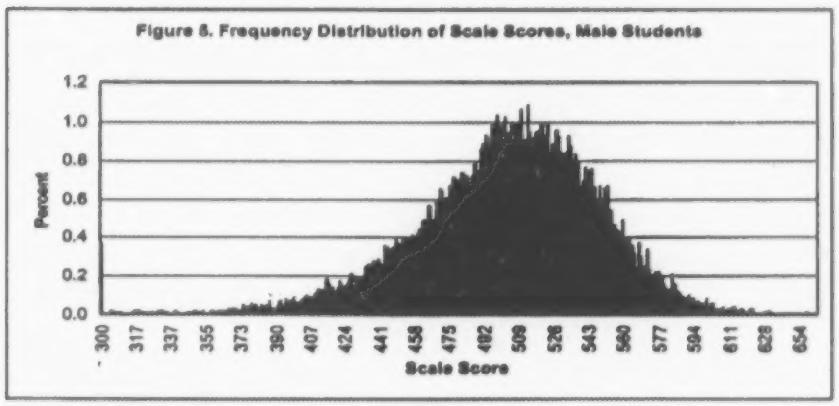
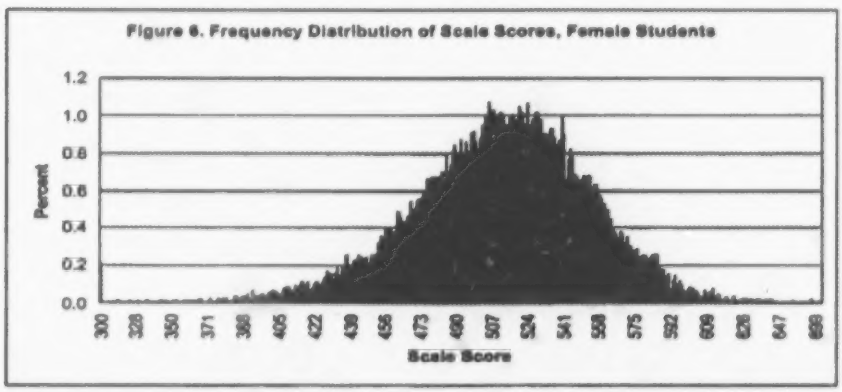
Scale Scores	Frequency	Percent	Cumulative Frequency	Cumulative Percent	Scale Scores	Frequency	Percent	Cumulative Frequency	Cumulative Percent
660	2	0.00	53545	99.95	685	5	0.01	53558	99.98
667	3	0.01	53548	99.96	686	1	0.00	53559	99.98
670	1	0.00	53549	99.96	687	2	0.00	53561	99.98
675	2	0.00	53551	99.96	699	1	0.00	53562	99.99
676	1	0.00	53552	99.97	714	4	0.01	53566	99.99
677	1	0.00	53553	99.97	720	4	0.01	53570	100.00

Figures 4 – 6. Frequency Distributions of Scale Scores: Grade 4, Reading







Appendix A-3. Frequency Distribution of Scale Scores. Grade 4. English. Writing. All Students

Scale Scores	Frequency	Percent	Cumulative Frequency	Cumulative Percent	Scale Scores	Frequency	Percent	Cumulative Frequency	Cumulative Percent
300	17	0.03	17	0.03	368	5	0.01	127	0.24
309	1	0.00	18	0.03	369	3	0.01	130	0.25
311	1	0.00	19	0.04	370	5	0.01	135	0.26
313	1	0.00	20	0.04	371	6	0.01	141	0.27
314	1	0.00	21	0.04	372	3	0.01	144	0.27
315	2	0.00	23	0.04	373	5	0.01	149	0.28
317	1	0.00	24	0.05	374	7	0.01	156	0.30
318	1	0.00	25	0.05	375	5	0.01	161	0.31
320	2	0.00	27	0.05	376	7	0.01	168	0.32
321	2	0.00	29	0.05	377	11	0.02	179	0.34
322	3	0.01	32	0.06	378	5	0.01	184	0.35
324	1	0.00	33	0.06	379	6	0.01	190	0.36
328	2	0.00	35	0.07	380	5	0.01	195	0.37
331	1	0.00	36	0.07	381	5	0.01	200	0.38
332	2	0.00	38	0.07	382	13	0.02	213	0.40
333	1	0.00	39	0.07	383	8	0.02	221	0.42
334	3	0.01	42	0.08	384	8	0.02	229	0.43
335	1	0.00	43	0.08	385	15	0.03	244	0.46
336	2	0.00	45	0.09	386	12	0.02	256	0.49
337	2	0.00	47	0.09	387	14	0.03	270	0.51
339	4	0.01	51	0.10	388	16	0.03	286	0.54
340	3	0.01	54	0.10	389	15	0.03	301	0.57
341	2	0.00	56	0.11	390	10	0.02	311	0.59
342	1	0.00	57	0.11	391	14	0.03	325	0.62
344	1	0.00	58	0.11	392	16	0.03	341	0.65
345	3	0.01	61	0.12	393	15	0.03	356	0.68
347	2	0.00	63	0.12	394	12	0.02	368	0.70
348	2	0.00	65	0.12	395	12	0.02	380	0.72
349	2	0.00	67	0.13	396	13	0.02	393	0.75
350	1	0.00	68	0.13	397	22	0.04	415	0.79
351	4	0.01	72	0.14	398	11	0.02	426	0.81
353	3	0.01	75	0.14	399	18	0.03	444	0.84
355	4	0.01	79	0.15	400	22	0.04	466	0.88
356	2	0.00	81	0.15	401	21	0.04	487	0.92
358	4	0.01	85	0.16	402	15	0.03	502	0.95
359	3	0.01	88	0.17	403	27	0.05	529	1.00
360	3	0.01	91	0.17	404	25	0.05	554	1.05
361	7	0.01	98	0.19	405	29	0.06	583	1.11
362	5	0.01	103	0.20	406	34	0.06	617	1.17
363	3	0.01	106	0.20	407	42	0.08	659	1.25
364	6	0.01	112	0.21	408	34	0.06	693	1.31
365	3	0.01	115	0.22	409	34	0.06	727	1.38
366	4	0.01	119	0.23	410	38	0.07	765	1.45
367	3	0.01	122	0.23	411	34	0.06	799	1.52

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Scale Scores	Frequency	Percent	Cumulative Frequency	Cumulative Percent	Scale Scores	Frequency	Percent	Cumulative Frequency	Cumulative Percent
412	36	0.07	835	1.56	456	218	0.41	5525	10.48
413	36	0.07	871	1.65	457	212	0.40	5737	10.88
414	47	0.09	918	1.74	458	211	0.40	5948	11.28
415	42	0.08	960	1.82	459	234	0.44	6182	11.72
416	60	0.11	1020	1.93	460	241	0.46	6423	12.18
417	50	0.09	1070	2.03	461	211	0.40	6634	12.58
418	58	0.11	1128	2.14	462	254	0.48	6888	13.06
419	57	0.11	1185	2.25	463	239	0.45	7127	13.51
420	61	0.12	1246	2.36	464	242	0.46	7369	13.97
421	50	0.09	1296	2.46	465	263	0.50	7632	14.47
422	57	0.11	1353	2.57	466	262	0.50	7894	14.97
423	54	0.10	1407	2.67	467	273	0.52	8167	15.49
424	63	0.12	1470	2.79	468	269	0.51	8436	16.00
425	62	0.12	1532	2.91	469	282	0.53	8718	16.53
426	69	0.13	1601	3.04	470	301	0.57	9019	17.10
427	89	0.17	1690	3.20	471	292	0.55	9311	17.66
428	67	0.13	1757	3.33	472	324	0.61	9635	18.27
429	82	0.16	1839	3.49	473	344	0.65	9979	18.92
430	75	0.14	1914	3.63	474	339	0.64	10318	19.57
431	86	0.16	2000	3.79	475	333	0.63	10651	20.20
432	90	0.17	2090	3.96	476	316	0.60	10967	20.80
433	104	0.20	2194	4.16	477	338	0.64	11305	21.44
434	84	0.16	2278	4.32	478	330	0.63	11635	22.06
435	104	0.20	2382	4.52	479	404	0.77	12039	22.83
436	110	0.21	2492	4.73	480	364	0.69	12403	23.52
437	127	0.24	2619	4.97	481	393	0.75	12796	24.26
438	101	0.19	2720	5.16	482	371	0.70	13167	24.97
439	88	0.17	2808	5.32	483	393	0.75	13560	25.71
440	118	0.22	2926	5.55	484	426	0.81	13986	26.52
441	142	0.27	3068	5.82	485	393	0.75	14379	27.27
442	140	0.27	3208	6.08	486	438	0.83	14817	28.10
443	129	0.24	3337	6.33	487	476	0.90	15293	29.00
444	134	0.25	3471	6.58	488	479	0.91	15772	29.91
445	134	0.25	3605	6.84	489	429	0.81	16201	30.72
446	137	0.26	3742	7.10	490	460	0.87	16661	31.59
447	152	0.29	3894	7.38	491	491	0.93	17152	32.52
448	162	0.31	4056	7.69	492	484	0.92	17636	33.44
449	150	0.28	4206	7.98	493	466	0.88	18102	34.33
450	176	0.33	4382	8.31	494	475	0.90	18577	35.23
451	177	0.34	4559	8.64	495	532	1.01	19109	36.24
452	181	0.34	4740	8.99	496	482	0.91	19591	37.15
453	192	0.36	4932	9.35	497	509	0.97	20100	38.11
454	185	0.35	5117	9.70	498	474	0.90	20574	39.01
455	190	0.36	5307	10.06	499	538	1.02	21112	40.03

Continue.....

Continue....

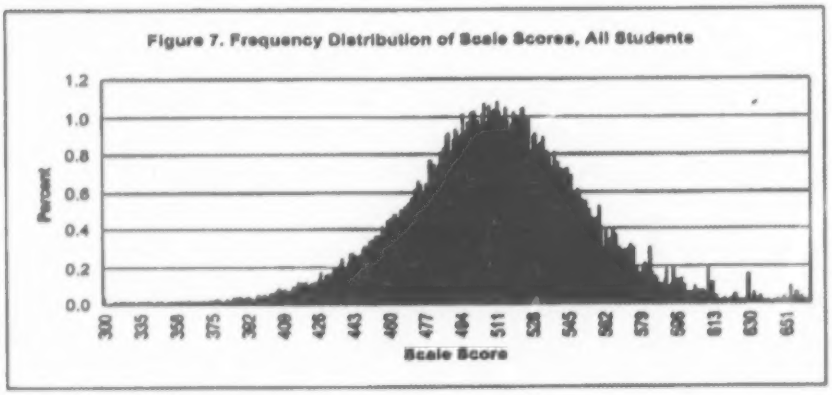
Scale Scores	Frequency	Percent	Cumulative Frequency	Cumulative Percent	Scale Scores	Frequency	Percent	Cumulative Frequency	Cumulative Percent
500	542	1.03	21654	41.06	544	378	0.72	42814	81.19
501	506	0.96	22160	42.02	545	346	0.66	43160	81.84
502	519	0.98	22679	43.00	546	362	0.69	43522	82.53
503	497	0.94	23176	43.95	547	313	0.59	43835	83.12
504	534	1.01	23710	44.96	548	300	0.57	44135	83.69
505	564	1.07	24274	46.03	549	324	0.61	44459	84.30
506	509	0.97	24783	46.99	550	319	0.60	44778	84.91
507	556	1.05	25339	48.05	551	291	0.55	45069	85.46
508	541	1.03	25880	49.07	552	264	0.50	45333	85.96
509	530	1.01	26410	50.08	553	287	0.54	45620	86.51
510	545	1.03	26955	51.11	554	265	0.50	45885	87.01
511	566	1.07	27521	52.19	555	233	0.44	46118	87.45
512	542	1.03	28063	53.21	556	243	0.46	46361	87.91
513	516	0.98	28579	54.19	557	215	0.41	46576	88.32
514	522	0.99	29101	55.18	558	236	0.45	46812	88.77
515	551	1.04	29652	56.23	559	273	0.52	47085	89.28
516	519	0.98	30171	57.21	560	218	0.41	47303	89.70
517	486	0.92	30657	58.13	561	159	0.30	47462	90.00
518	505	0.96	31162	59.09	562	207	0.39	47669	90.39
519	536	1.02	31698	60.11	563	155	0.29	47824	90.69
520	529	1.00	32227	61.11	564	183	0.35	48007	91.03
521	522	0.99	32749	62.10	565	208	0.39	48215	91.43
522	514	0.97	33263	63.07	566	198	0.38	48413	91.80
523	549	1.04	33812	64.12	567	191	0.36	48604	92.16
524	529	1.00	34341	65.12	568	158	0.30	48762	92.46
525	461	0.87	34802	65.99	569	148	0.28	48910	92.74
526	524	0.99	35326	66.99	570	131	0.25	49041	92.99
527	428	0.81	35754	67.80	571	151	0.29	49192	93.28
528	471	0.89	36225	68.69	572	132	0.25	49324	93.53
529	478	0.91	36703	69.60	573	153	0.29	49477	93.82
530	440	0.83	37143	70.43	574	166	0.31	49643	94.13
531	451	0.86	37594	71.29	575	159	0.30	49802	94.44
532	419	0.79	38013	72.08	576	104	0.20	49906	94.63
533	466	0.88	38479	72.97	577	99	0.19	50005	94.82
534	428	0.81	38907	73.78	578	86	0.16	50091	94.98
535	417	0.79	39324	74.57	579	80	0.15	50171	95.14
536	413	0.78	39737	75.35	580	98	0.19	50269	95.32
537	384	0.73	40121	76.08	581	111	0.21	50380	95.53
538	426	0.81	40547	76.89	582	98	0.19	50478	95.72
539	398	0.75	40945	77.64	583	158	0.30	50636	96.02
540	400	0.76	41345	78.40	584	87	0.16	50723	96.18
541	380	0.72	41725	79.12	585	76	0.14	50799	96.33
542	336	0.64	42061	79.76	586	68	0.13	50866	96.45
543	375	0.71	42436	80.47	587	44	0.08	50910	96.54

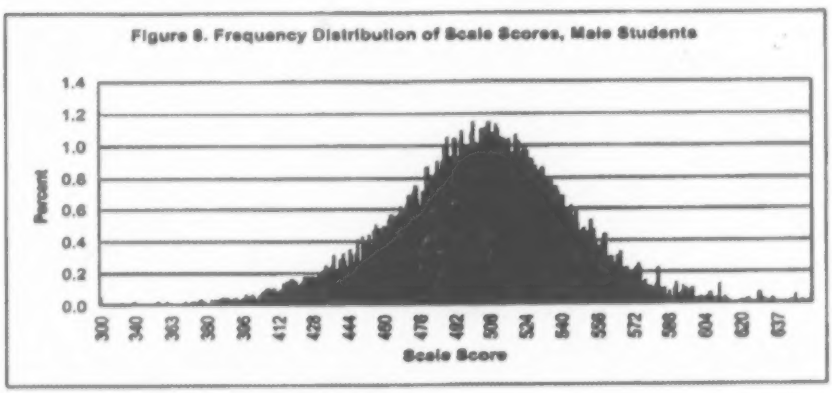
Continue...

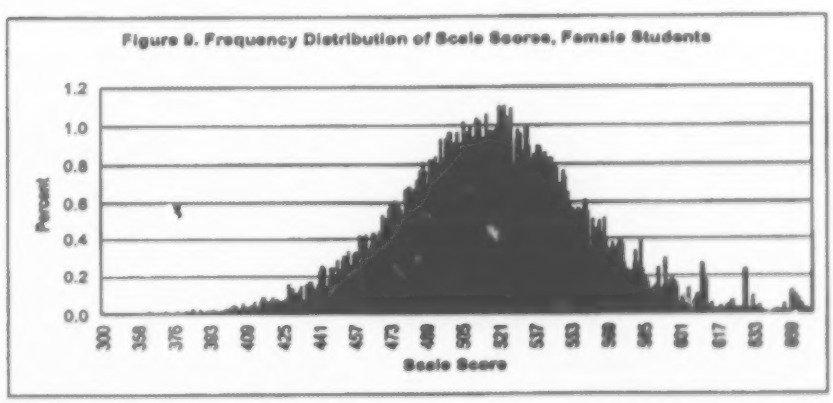
Continue....

Scale Scores	Frequency	Percent	Cumulative Frequency	Cumulative Percent	Scale Scores	Frequency	Percent	Cumulative Frequency	Cumulative Percent
588	55	0.10	50965	96.64	624	9	0.02	52265	99.11
589	34	0.06	50999	96.71	625	7	0.01	52272	99.12
590	64	0.12	51063	96.83	626	8	0.02	52280	99.14
591	97	0.18	51160	97.01	627	3	0.01	52283	99.14
592	47	0.09	51207	97.10	628	8	0.02	52291	99.16
593	54	0.10	51261	97.20	629	79	0.15	52370	99.31
594	104	0.20	51365	97.40	630	7	0.01	52377	99.32
595	66	0.13	51431	97.53	631	12	0.02	52389	99.34
596	66	0.13	51497	97.65	632	28	0.05	52417	99.40
597	66	0.13	51563	97.78	633	10	0.02	52427	99.41
598	68	0.13	51631	97.90	634	10	0.02	52437	99.43
599	49	0.09	51680	98.00	635	18	0.03	52455	99.47
600	22	0.04	51702	98.04	636	5	0.01	52460	99.48
601	29	0.05	51731	98.09	637	3	0.01	52463	99.48
602	31	0.06	51762	98.15	638	4	0.01	52467	99.49
603	21	0.04	51783	98.19	639	3	0.01	52470	99.50
604	45	0.09	51828	98.28	640	1	0.00	52471	99.50
605	17	0.03	51845	98.31	641	4	0.01	52475	99.51
606	33	0.06	51878	98.37	643	3	0.01	52478	99.51
607	24	0.05	51902	98.42	644	7	0.01	52485	99.52
608	35	0.07	51937	98.48	645	3	0.01	52488	99.53
609	28	0.05	51965	98.54	648	3	0.01	52491	99.54
610	100	0.19	52065	98.73	650	17	0.03	52508	99.57
611	16	0.03	52081	98.76	651	1	0.00	52509	99.57
612	56	0.11	52137	98.86	652	6	0.01	52515	99.58
613	16	0.03	52153	98.89	659	45	0.09	52560	99.67
614	19	0.04	52172	98.93	662	11	0.02	52571	99.69
615	8	0.02	52180	98.95	663	28	0.05	52599	99.74
616	7	0.01	52187	98.96	664	26	0.05	52625	99.79
617	4	0.01	52191	98.97	665	6	0.01	52631	99.80
618	10	0.02	52201	98.99	669	15	0.03	52646	99.83
619	4	0.01	52205	98.99	671	9	0.02	52655	99.85
620	7	0.01	52212	99.01	673	8	0.02	52663	99.86
621	12	0.02	52224	99.03	698	2	0.00	52665	99.87
622	10	0.02	52234	99.05	720	71	0.13	52736	100.00
623	22	0.04	52256	99.09					

Figures 7 – 9. Frequency Distributions of Scale Scores: Grade 4, Writing







Appendix A-4. Frequency Distribution of Scale Scores. Grade 7. English. Reading. All Students

Scale Scores	Frequency	Percent	Cumulative Frequency	Cumulative Percent	Scale Scores	Frequency	Percent	Cumulative Frequency	Cumulative Percent
300	116	0.22	116	0.22	348	12	0.02	344	0.66
301	1	0.00	117	0.22	349	13	0.02	357	0.68
302	5	0.01	122	0.23	350	9	0.02	366	0.70
303	1	0.00	123	0.24	351	15	0.03	381	0.73
304	3	0.01	126	0.24	352	6	0.01	387	0.74
306	4	0.01	130	0.25	353	12	0.02	399	0.76
309	1	0.00	131	0.25	354	14	0.03	413	0.79
310	4	0.01	135	0.26	355	11	0.02	424	0.81
311	3	0.01	138	0.26	356	18	0.03	442	0.84
312	1	0.00	139	0.27	357	15	0.03	457	0.87
313	2	0.00	141	0.27	358	7	0.01	464	0.89
314	3	0.01	144	0.28	359	7	0.01	471	0.90
315	2	0.00	146	0.28	360	18	0.03	489	0.93
317	3	0.01	149	0.28	361	11	0.02	500	0.96
318	2	0.00	151	0.29	362	15	0.03	515	0.98
319	3	0.01	154	0.29	363	17	0.03	532	1.02
320	5	0.01	159	0.30	364	22	0.04	554	1.06
321	2	0.00	161	0.31	365	20	0.04	574	1.10
322	2	0.00	163	0.31	366	22	0.04	596	1.14
323	6	0.01	169	0.32	367	22	0.04	618	1.18
324	5	0.01	174	0.33	368	15	0.03	633	1.21
325	6	0.01	180	0.34	369	17	0.03	650	1.24
326	3	0.01	183	0.35	370	18	0.03	668	1.28
327	4	0.01	187	0.36	371	17	0.03	685	1.31
328	2	0.00	189	0.36	372	15	0.03	700	1.34
329	1	0.00	190	0.36	373	23	0.04	723	1.38
330	3	0.01	193	0.37	374	16	0.03	739	1.41
331	7	0.01	200	0.38	375	17	0.03	756	1.44
332	3	0.01	203	0.39	376	16	0.03	772	1.48
333	7	0.01	210	0.40	377	27	0.05	799	1.53
334	3	0.01	213	0.41	378	27	0.05	826	1.58
335	6	0.01	219	0.42	379	18	0.03	844	1.61
336	8	0.02	227	0.43	380	24	0.05	868	1.66
337	8	0.02	235	0.45	381	24	0.05	892	1.70
338	12	0.02	247	0.47	382	26	0.05	918	1.75
339	8	0.02	255	0.49	383	31	0.06	949	1.81
340	8	0.02	263	0.50	384	34	0.06	983	1.88
341	8	0.02	271	0.52	385	27	0.05	1010	1.93
342	12	0.02	283	0.54	386	33	0.06	1043	1.99
343	8	0.02	291	0.56	387	38	0.07	1081	2.07
344	7	0.01	298	0.57	388	36	0.07	1117	2.13
345	12	0.02	310	0.59	389	40	0.08	1157	2.21
346	15	0.03	325	0.62	390	36	0.07	1193	2.28
347	7	0.01	332	0.63	391	43	0.08	1236	2.36

Continue.....

Continue.....

Scale Scores	Frequency	Percent	Cumulative Frequency	Cumulative Percent	Scale Scores	Frequency	Percent	Cumulative Frequency	Cumulative Percent
392	33	0.06	1269	2.43	436	146	0.28	4877	9.32
393	46	0.09	1315	2.51	437	139	0.27	5016	9.59
394	45	0.09	1360	2.60	438	148	0.28	5164	9.87
395	41	0.08	1401	2.68	439	168	0.32	5332	10.19
396	42	0.08	1443	2.76	440	173	0.33	5505	10.52
397	33	0.06	1476	2.82	441	166	0.32	5671	10.84
398	42	0.08	1518	2.90	442	177	0.34	5848	11.18
399	47	0.09	1565	2.99	443	160	0.31	6008	11.48
400	45	0.09	1610	3.08	444	166	0.32	6174	11.80
401	42	0.08	1652	3.16	445	177	0.34	6351	12.14
402	52	0.10	1704	3.26	446	214	0.41	6565	12.55
403	54	0.10	1758	3.36	447	175	0.33	6740	12.88
404	67	0.13	1825	3.49	448	175	0.33	6915	13.21
405	55	0.11	1880	3.59	449	209	0.40	7124	13.61
406	58	0.11	1938	3.70	450	202	0.39	7326	14.00
407	61	0.12	1999	3.82	451	191	0.37	7517	14.37
408	62	0.12	2061	3.94	452	220	0.42	7737	14.79
409	67	0.13	2128	4.07	453	209	0.40	7946	15.19
410	76	0.15	2204	4.21	454	235	0.45	8181	15.63
411	58	0.11	2262	4.32	455	235	0.45	8416	16.08
412	82	0.16	2344	4.48	456	237	0.45	8653	16.54
413	75	0.14	2419	4.62	457	239	0.46	8892	16.99
414	78	0.15	2497	4.77	458	232	0.44	9124	17.44
415	66	0.13	2563	4.90	459	234	0.45	9358	17.88
416	71	0.14	2634	5.03	460	254	0.49	9612	18.37
417	73	0.14	2707	5.17	461	243	0.46	9855	18.83
418	78	0.15	2785	5.32	462	247	0.47	10102	19.31
419	84	0.16	2869	5.48	463	228	0.44	10330	19.74
420	108	0.21	2977	5.69	464	278	0.53	10608	20.27
421	98	0.19	3075	5.88	465	270	0.52	10878	20.79
422	115	0.22	3190	6.10	466	289	0.55	11167	21.34
423	98	0.19	3288	6.28	467	276	0.53	11443	21.87
424	89	0.17	3377	6.45	468	304	0.58	11747	22.45
425	119	0.23	3496	6.68	469	277	0.53	12024	22.98
426	107	0.20	3603	6.89	470	296	0.57	12320	23.54
427	113	0.22	3716	7.10	471	323	0.62	12643	24.16
428	115	0.22	3831	7.32	472	335	0.64	12978	24.80
429	118	0.23	3949	7.55	473	321	0.61	13299	25.42
430	109	0.21	4058	7.76	474	314	0.60	13613	26.02
431	141	0.27	4199	8.02	475	306	0.58	13919	26.60
432	125	0.24	4324	8.26	476	308	0.59	14227	27.19
433	157	0.30	4481	8.56	477	338	0.65	14565	27.83
434	114	0.22	4595	8.78	478	340	0.65	14905	28.48
435	136	0.26	4731	9.04	479	336	0.64	15241	29.13

Continue.....

Continue....

Scale Scores	Frequency	Percent	Cumulative Frequency	Cumulative Percent	Scale Scores	Frequency	Percent	Cumulative Frequency	Cumulative Percent
480	374	0.71	15615	29.84	524	428	0.82	34340	65.63
481	383	0.73	15998	30.57	525	440	0.84	34780	66.47
482	372	0.71	16370	31.28	526	393	0.75	35173	67.22
483	375	0.72	16745	32.00	527	398	0.76	35571	67.98
484	324	0.62	17069	32.62	528	461	0.88	36032	68.86
485	385	0.74	17454	33.36	529	415	0.79	36447	69.65
486	349	0.67	17803	34.02	530	460	0.88	36907	70.53
487	405	0.77	18208	34.80	531	412	0.79	37319	71.32
488	398	0.76	18606	35.56	532	425	0.81	37744	72.13
489	422	0.81	19028	36.36	533	367	0.70	38111	72.83
490	387	0.74	19415	37.10	534	400	0.76	38511	73.60
491	419	0.80	19834	37.90	535	407	0.78	38918	74.37
492	401	0.77	20235	38.67	536	425	0.81	39343	75.19
493	410	0.78	20645	39.45	537	387	0.74	39730	75.93
494	411	0.79	21056	40.24	538	355	0.68	40085	76.60
495	453	0.87	21509	41.10	539	385	0.74	40470	77.34
496	426	0.81	21935	41.92	540	370	0.71	40840	78.05
497	424	0.81	22359	42.73	541	382	0.73	41222	78.78
498	405	0.77	22764	43.50	542	382	0.73	41604	79.51
499	415	0.79	23179	44.30	543	333	0.64	41937	80.14
500	408	0.78	23587	45.08	544	351	0.67	42288	80.81
501	443	0.85	24030	45.92	545	346	0.66	42634	81.48
502	430	0.82	24460	46.74	546	320	0.61	42954	82.09
503	439	0.84	24899	47.58	547	348	0.67	43302	82.75
504	416	0.80	25315	48.38	548	337	0.64	43639	83.40
505	459	0.88	25774	49.26	549	321	0.61	43960	84.01
506	458	0.88	26232	50.13	550	318	0.61	44278	84.62
507	459	0.88	26691	51.01	551	288	0.55	44566	85.17
508	475	0.91	27166	51.92	552	302	0.58	44868	85.75
509	479	0.92	27645	52.83	553	280	0.54	45148	86.28
510	458	0.88	28103	53.71	554	272	0.52	45420	86.80
511	433	0.83	28536	54.53	555	261	0.50	45681	87.30
512	454	0.87	28990	55.40	556	241	0.46	45922	87.76
513	465	0.89	29455	56.29	557	234	0.45	46156	88.21
514	457	0.87	29912	57.16	558	267	0.51	46423	88.72
515	478	0.91	30390	58.08	559	228	0.44	46651	89.15
516	426	0.81	30816	58.89	560	212	0.41	46863	89.56
517	453	0.87	31269	59.76	561	239	0.46	47102	90.01
518	441	0.84	31710	60.60	562	215	0.41	47317	90.43
519	474	0.91	32184	61.51	563	205	0.39	47522	90.82
520	448	0.86	32632	62.36	564	207	0.40	47729	91.21
521	402	0.77	33034	63.13	565	231	0.44	47960	91.65
522	433	0.83	33467	63.96	566	219	0.42	48179	92.07
523	445	0.85	33912	64.81	567	191	0.37	48370	92.44

Continue....

Continue.....

Scale Scores	Frequency	Percent	Cumulative Frequency	Cumulative Percent	Scale Scores	Frequency	Percent	Cumulative Frequency	Cumulative Percent
568	180	0.34	48550	92.78	612	14	0.03	52014	99.40
569	167	0.32	48717	93.10	613	13	0.02	52027	99.43
570	172	0.33	48889	93.43	614	19	0.04	52046	99.46
571	156	0.30	49045	93.73	615	19	0.04	52065	99.50
572	146	0.28	49191	94.01	616	11	0.02	52076	99.52
573	157	0.30	49348	94.31	617	16	0.03	52092	99.55
574	149	0.28	49497	94.59	618	11	0.02	52103	99.57
575	119	0.23	49616	94.82	619	16	0.03	52119	99.60
576	139	0.27	49755	95.08	620	16	0.03	52135	99.63
577	126	0.24	49881	95.33	621	17	0.03	52152	99.67
578	122	0.23	50003	95.56	622	8	0.02	52160	99.68
579	151	0.29	50154	95.85	623	15	0.03	52175	99.71
580	108	0.21	50262	96.05	624	8	0.02	52183	99.72
581	95	0.18	50357	96.24	625	4	0.01	52187	99.73
582	89	0.17	50446	96.41	626	13	0.02	52200	99.76
583	116	0.22	50562	96.63	627	8	0.02	52208	99.77
584	103	0.20	50665	96.82	628	6	0.01	52214	99.78
585	101	0.19	50766	97.02	629	6	0.01	52220	99.80
586	66	0.13	50832	97.14	630	8	0.02	52228	99.81
587	75	0.14	50907	97.29	631	8	0.02	52236	99.83
588	74	0.14	50981	97.43	632	13	0.02	52249	99.85
589	75	0.14	51056	97.57	633	8	0.02	52257	99.87
590	68	0.13	51124	97.70	634	3	0.01	52260	99.87
591	71	0.14	51195	97.84	635	7	0.01	52267	99.89
592	59	0.11	51254	97.95	636	3	0.01	52270	99.89
593	55	0.11	51309	98.05	637	3	0.01	52273	99.90
594	69	0.13	51378	98.19	638	7	0.01	52280	99.91
595	57	0.11	51435	98.30	639	7	0.01	52287	99.92
596	43	0.08	51478	98.38	641	3	0.01	52290	99.93
597	44	0.08	51522	98.46	642	2	0.00	52292	99.93
598	54	0.10	51576	98.56	643	1	0.00	52293	99.94
599	39	0.07	51615	98.64	644	1	0.00	52294	99.94
600	42	0.08	51657	98.72	645	2	0.00	52296	99.94
601	38	0.07	51695	98.79	646	4	0.01	52300	99.95
602	31	0.06	51726	98.85	647	1	0.00	52301	99.95
603	47	0.09	51773	98.94	650	1	0.00	52302	99.95
604	32	0.06	51805	99.00	651	1	0.00	52303	99.95
605	24	0.05	51829	99.05	652	1	0.00	52304	99.96
606	36	0.07	51865	99.12	653	1	0.00	52305	99.96
607	26	0.05	51891	99.17	654	1	0.00	52306	99.96
608	29	0.06	51920	99.22	655	2	0.00	52308	99.96
609	29	0.06	51949	99.28	656	1	0.00	52309	99.97
610	24	0.05	51973	99.32	658	3	0.01	52312	99.97
611	27	0.05	52000	99.38	659	1	0.00	52313	99.97

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Scale Scores	Frequency	Percent	Cumulative Frequency	Cumulative Percent	Scale Scores	Frequency	Percent	Cumulative Frequency	Cumulative Percent
660	2	0.00	52315	99.98	680	1	0.00	52323	99.99
661	1	0.00	52316	99.98	683	1	0.00	52324	99.99
664	1	0.00	52317	99.98	685	1	0.00	52325	100.00
665	2	0.00	52319	99.98	687	1	0.00	52326	100.00
671	2	0.00	52321	99.99	736	1	0.00	52327	100.00
679	1	0.00	52322	99.99					

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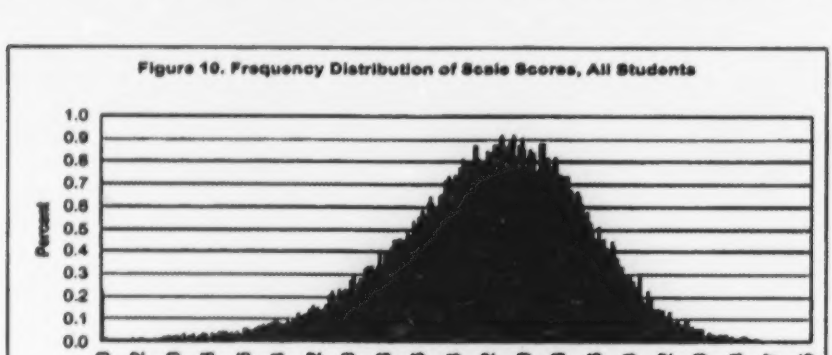
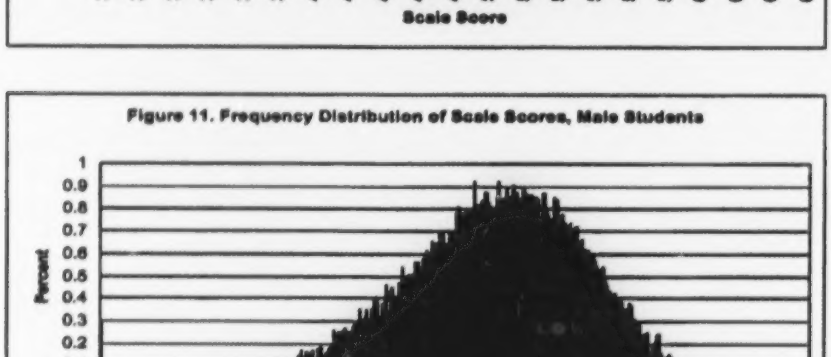
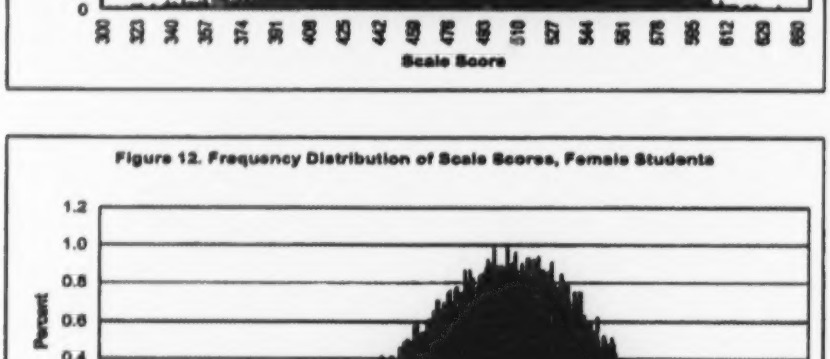
Figures 10-12. Frequency Distributions of Scale Scores: Grade 7, Reading







Appendix A-5. Frequency Distribution of Scale Scores. Grade 7. English. Writing. All Students

Scale Scores	Frequency	Percent	Cumulative Frequency	Cumulative Percent	Scale Scores	Frequency	Percent	Cumulative Frequency	Cumulative Percent
300	30	0.06	30	0.06	354	5	0.01	186	0.36
304	1	0.00	31	0.06	355	9	0.02	195	0.38
305	1	0.00	32	0.06	356	7	0.01	202	0.39
306	2	0.00	34	0.07	357	6	0.01	208	0.40
307	2	0.00	36	0.07	358	9	0.02	217	0.42
311	2	0.00	38	0.07	359	3	0.01	220	0.43
314	1	0.00	39	0.08	360	9	0.02	229	0.45
315	2	0.00	41	0.08	361	7	0.01	236	0.46
317	2	0.00	43	0.08	362	10	0.02	246	0.48
318	3	0.01	46	0.09	363	7	0.01	253	0.49
319	1	0.00	47	0.09	364	15	0.03	268	0.52
320	2	0.00	49	0.10	365	12	0.02	280	0.54
321	4	0.01	53	0.10	366	15	0.03	295	0.57
322	3	0.01	56	0.11	367	9	0.02	304	0.59
323	1	0.00	57	0.11	368	8	0.02	312	0.61
324	3	0.01	60	0.12	369	17	0.03	329	0.64
325	2	0.00	62	0.12	370	12	0.02	341	0.66
326	1	0.00	63	0.12	371	12	0.02	353	0.69
327	4	0.01	67	0.13	372	7	0.01	360	0.70
329	2	0.00	69	0.13	373	15	0.03	375	0.73
330	2	0.00	71	0.14	374	16	0.03	391	0.76
331	3	0.01	74	0.14	375	17	0.03	408	0.79
332	9	0.02	83	0.16	376	15	0.03	423	0.82
333	3	0.01	86	0.17	377	17	0.03	440	0.86
334	1	0.00	87	0.17	378	19	0.04	459	0.89
335	1	0.00	88	0.17	379	24	0.05	483	0.94
336	3	0.01	91	0.18	380	24	0.05	507	0.99
337	3	0.01	94	0.18	381	25	0.05	532	1.04
338	4	0.01	98	0.19	382	24	0.05	556	1.08
339	3	0.01	101	0.20	383	23	0.04	579	1.13
340	2	0.00	103	0.20	384	16	0.03	595	1.16
341	4	0.01	107	0.21	385	24	0.05	619	1.20
342	5	0.01	112	0.22	386	34	0.07	653	1.27
343	5	0.01	117	0.23	387	35	0.07	688	1.34
344	8	0.02	125	0.24	388	32	0.06	720	1.40
345	8	0.02	133	0.26	389	38	0.07	758	1.48
346	5	0.01	138	0.27	390	32	0.06	790	1.54
347	5	0.01	143	0.28	391	30	0.06	820	1.60
348	9	0.02	152	0.30	392	18	0.04	838	1.63
349	3	0.01	155	0.30	393	36	0.07	874	1.70
350	12	0.02	167	0.33	394	34	0.07	908	1.77
351	8	0.02	175	0.34	395	41	0.08	949	1.85
352	1	0.00	176	0.34	396	40	0.08	989	1.92
353	5	0.01	181	0.35	397	53	0.10	1042	2.03

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Scale Scores	Frequency	Percent	Cumulative Frequency	Cumulative Percent	Scale Scores	Frequency	Percent	Cumulative Frequency	Cumulative Percent
398	48	0.09	1090	2.12	442	186	0.36	5831	11.35
399	29	0.06	1119	2.18	443	186	0.36	6017	11.71
400	53	0.10	1172	2.28	444	226	0.44	6243	12.15
401	59	0.11	1231	2.40	445	211	0.41	6454	12.56
402	46	0.09	1277	2.49	446	211	0.41	6665	12.97
403	47	0.09	1324	2.58	447	215	0.42	6880	13.39
404	60	0.12	1384	2.69	448	255	0.50	7135	13.89
405	67	0.13	1451	2.82	449	227	0.44	7362	14.33
406	61	0.12	1512	2.94	450	224	0.44	7586	14.76
407	70	0.14	1582	3.08	451	237	0.46	7823	15.23
408	77	0.15	1659	3.23	452	241	0.47	8064	15.70
409	60	0.12	1719	3.35	453	235	0.46	8299	16.15
410	66	0.13	1785	3.47	454	259	0.50	8558	16.66
411	64	0.12	1849	3.60	455	259	0.50	8817	17.16
412	74	0.14	1923	3.74	456	254	0.49	9071	17.66
413	60	0.12	1983	3.86	457	255	0.50	9326	18.15
414	78	0.15	2061	4.01	458	261	0.51	9587	18.66
415	83	0.16	2144	4.17	459	252	0.49	9839	19.15
416	94	0.18	2238	4.36	460	269	0.52	10108	19.67
417	93	0.18	2331	4.54	461	305	0.59	10413	20.27
418	88	0.17	2419	4.71	462	285	0.55	10698	20.82
419	96	0.19	2515	4.89	463	293	0.57	10991	21.39
420	102	0.20	2617	5.09	464	278	0.54	11269	21.93
421	110	0.21	2727	5.31	465	329	0.64	11598	22.57
422	108	0.21	2835	5.52	466	319	0.62	11917	23.19
423	102	0.20	2937	5.72	467	312	0.61	12229	23.80
424	102	0.20	3039	5.91	468	329	0.64	12558	24.44
425	125	0.24	3164	6.16	469	298	0.58	12856	25.02
426	146	0.28	3310	6.44	470	346	0.67	13202	25.70
427	128	0.25	3438	6.69	471	394	0.77	13596	26.46
428	139	0.27	3577	6.96	472	359	0.70	13955	27.16
429	140	0.27	3717	7.23	473	358	0.70	14313	27.86
430	153	0.30	3870	7.53	474	351	0.68	14664	28.54
431	136	0.26	4006	7.80	475	357	0.69	15021	29.24
432	147	0.29	4153	8.08	476	365	0.71	15386	29.95
433	149	0.29	4302	8.37	477	367	0.71	15753	30.66
434	166	0.32	4468	8.70	478	365	0.71	16118	31.37
435	161	0.31	4629	9.01	479	377	0.73	16495	32.10
436	180	0.35	4809	9.36	480	399	0.78	16894	32.88
437	156	0.30	4965	9.66	481	430	0.84	17324	33.72
438	157	0.31	5122	9.97	482	344	0.67	17668	34.39
439	170	0.33	5292	10.30	483	417	0.81	18085	35.20
440	178	0.35	5470	10.65	484	417	0.81	18502	36.01
441	175	0.34	5645	10.99	485	407	0.79	18909	36.80

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Scale Scores	Frequency	Percent	Cumulative Frequency	Cumulative Percent	Scale Scores	Frequency	Percent	Cumulative Frequency	Cumulative Percent
486	421	0.82	19330	37.62	530	392	0.76	37750	73.47
487	367	0.71	19697	38.34	531	378	0.74	38128	74.21
488	395	0.77	20092	39.11	532	374	0.73	38502	74.94
489	399	0.78	20491	39.88	533	365	0.71	38867	75.65
490	428	0.83	20919	40.72	534	331	0.64	39198	76.29
491	457	0.89	21376	41.60	535	347	0.68	39545	76.97
492	400	0.78	21776	42.38	536	344	0.67	39889	77.64
493	418	0.81	22194	43.20	537	336	0.65	40225	78.29
494	411	0.80	22605	44.00	538	325	0.63	40550	78.92
495	443	0.86	23048	44.86	539	304	0.59	40854	79.51
496	434	0.84	23482	45.70	540	311	0.61	41165	80.12
497	431	0.84	23913	46.54	541	323	0.63	41488	80.75
498	374	0.73	24287	47.27	542	315	0.61	41803	81.36
499	396	0.77	24683	48.04	543	288	0.56	42091	81.92
500	461	0.90	25144	48.94	544	309	0.60	42400	82.52
501	428	0.83	25572	49.77	545	282	0.55	42682	83.07
502	404	0.79	25976	50.56	546	305	0.59	42987	83.67
503	465	0.91	26441	51.46	547	271	0.53	43258	84.19
504	422	0.82	26863	52.28	548	285	0.55	43543	84.75
505	467	0.91	27330	53.19	549	245	0.48	43788	85.23
506	449	0.87	27779	54.07	550	273	0.53	44061	85.76
507	433	0.84	28212	54.91	551	218	0.42	44279	86.18
508	429	0.83	28641	55.74	552	234	0.46	44513	86.64
509	445	0.87	29086	56.61	553	237	0.46	44750	87.10
510	439	0.85	29525	57.47	554	250	0.49	45000	87.58
511	438	0.85	29963	58.32	555	210	0.41	45210	87.99
512	444	0.86	30407	59.18	556	198	0.39	45408	88.38
513	479	0.93	30886	60.11	557	240	0.47	45648	88.85
514	428	0.83	31314	60.95	558	224	0.44	45872	89.28
515	432	0.84	31746	61.79	559	199	0.39	46071	89.67
516	427	0.83	32173	62.62	560	183	0.36	46254	90.03
517	403	0.78	32576	63.40	561	188	0.37	46442	90.39
518	443	0.86	33019	64.27	562	177	0.34	46619	90.74
519	409	0.80	33428	65.06	563	162	0.32	46781	91.05
520	423	0.82	33851	65.88	564	170	0.33	46951	91.38
521	403	0.78	34254	66.67	565	163	0.32	47114	91.70
522	420	0.82	34674	67.49	566	171	0.33	47285	92.03
523	404	0.79	35078	68.27	567	157	0.31	47442	92.34
524	393	0.76	35471	69.04	568	145	0.28	47587	92.62
525	378	0.74	35849	69.77	569	155	0.30	47742	92.92
526	388	0.76	36237	70.53	570	153	0.30	47895	93.22
527	380	0.74	36617	71.27	571	129	0.25	48024	93.47
528	360	0.70	36977	71.97	572	142	0.28	48166	93.75
529	381	0.74	37358	72.71	573	118	0.23	48284	93.98

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Scale Score	Frequency	Percent	Cumulative Frequency	Cumulative Percent	Scale Score	Frequency	Percent	Cumulative Frequency	Cumulative Percent
574	120	0.23	48404	94.21	618	25	0.05	50860	98.99
575	128	0.25	48532	94.46	619	30	0.06	50890	99.05
576	122	0.24	48654	94.70	620	20	0.04	50910	99.09
577	123	0.24	48777	94.94	621	27	0.05	50937	99.14
578	113	0.22	48890	95.16	622	18	0.04	50955	99.17
579	96	0.19	48986	95.34	623	19	0.04	50974	99.21
580	79	0.15	49065	95.50	624	9	0.02	50983	99.23
581	98	0.19	49163	95.69	625	11	0.02	50994	99.25
582	88	0.17	49251	95.86	626	11	0.02	51005	99.27
583	95	0.18	49346	96.04	627	20	0.04	51025	99.31
584	84	0.16	49430	96.21	628	13	0.03	51038	99.34
585	77	0.15	49507	96.36	629	11	0.02	51049	99.36
586	69	0.13	49576	96.49	630	8	0.02	51057	99.37
587	74	0.14	49650	96.63	631	14	0.03	51071	99.40
588	90	0.18	49740	96.81	632	13	0.03	51084	99.43
589	67	0.13	49807	96.94	633	2	0.00	51086	99.43
590	64	0.12	49871	97.06	634	26	0.05	51112	99.48
591	56	0.11	49927	97.17	635	6	0.01	51118	99.49
592	63	0.12	49990	97.30	636	5	0.01	51123	99.50
593	46	0.09	50036	97.39	637	17	0.03	51140	99.53
594	55	0.11	50091	97.49	638	4	0.01	51144	99.54
595	45	0.09	50136	97.58	639	3	0.01	51147	99.55
596	62	0.12	50198	97.70	640	3	0.01	51150	99.55
597	49	0.10	50247	97.80	641	27	0.05	51177	99.61
598	45	0.09	50292	97.88	642	4	0.01	51181	99.61
599	36	0.07	50328	97.95	643	5	0.01	51186	99.62
600	42	0.08	50370	98.04	644	22	0.04	51208	99.67
601	32	0.06	50402	98.10	645	5	0.01	51213	99.68
602	23	0.04	50425	98.14	646	3	0.01	51216	99.68
603	33	0.06	50458	98.21	647	4	0.01	51220	99.69
604	26	0.05	50484	98.26	649	3	0.01	51223	99.70
605	44	0.09	50528	98.34	650	17	0.03	51240	99.73
606	26	0.05	50554	98.39	652	2	0.00	51242	99.73
607	37	0.07	50591	98.47	653	5	0.01	51247	99.74
608	42	0.08	50633	98.55	654	4	0.01	51251	99.75
609	37	0.07	50670	98.62	655	3	0.01	51254	99.76
610	18	0.04	50688	98.66	657	1	0.00	51255	99.76
611	23	0.04	50711	98.70	658	15	0.03	51270	99.79
612	14	0.03	50725	98.73	659	2	0.00	51272	99.79
613	26	0.05	50751	98.78	660	1	0.00	51273	99.79
614	26	0.05	50777	98.83	661	1	0.00	51274	99.80
615	24	0.05	50801	98.88	663	6	0.01	51280	99.81
616	11	0.02	50812	98.90	664	14	0.03	51294	99.83
617	23	0.04	50836	98.94	665	8	0.02	51302	99.85

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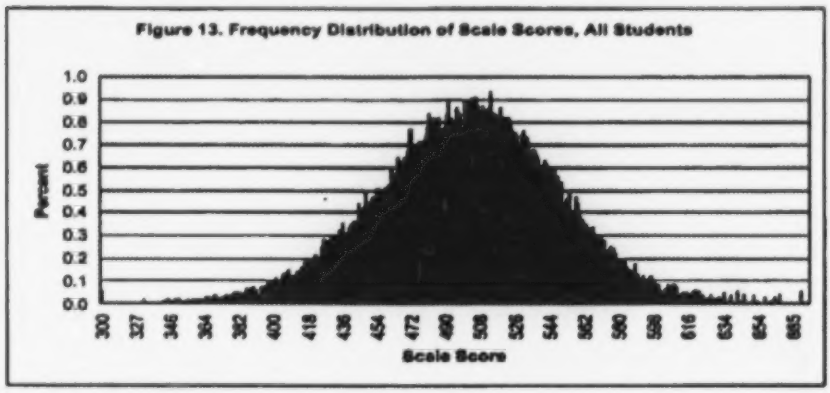
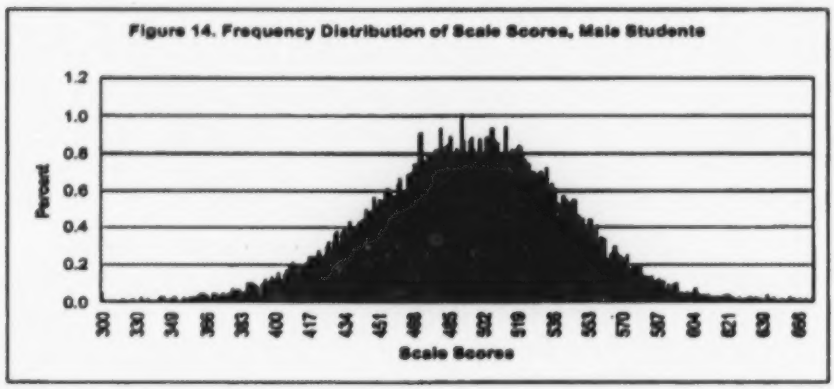
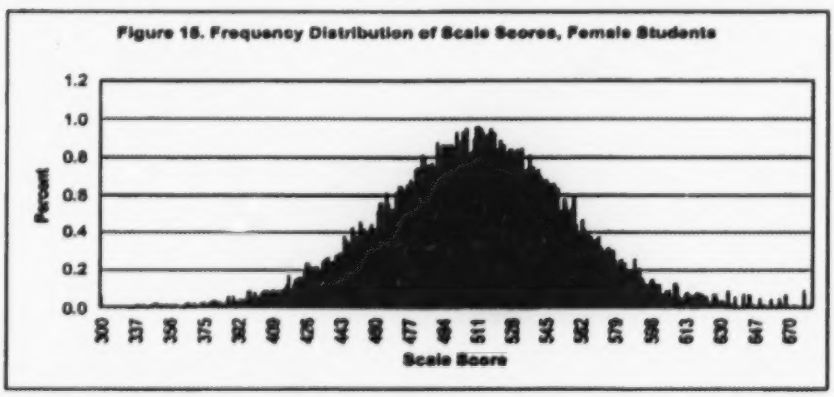
Scale Scores	Frequency	Percent	Cumulative Frequency	Cumulative Percent	Scale Scores	Frequency	Percent	Cumulative Frequency	Cumulative Percent
666	3	0.01	51305	99.86	697	1	0.00	51338	99.92
668	20	0.04	51325	99.89	692	1	0.00	51339	99.92
669	4	0.01	51329	99.90	703	1	0.00	51340	99.92
670	1	0.00	51330	99.90	704	27	0.05	51367	99.98
672	1	0.00	51331	99.91	705	1	0.00	51368	99.98
673	1	0.00	51332	99.91	710	2	0.00	51370	99.98
674	1	0.00	51333	99.91	711	2	0.00	51372	99.99
679	3	0.01	51336	99.92	780	7	0.01	51379	100.00
685	1	0.00	51337	99.92					

Figures 13-15. Frequency Distributions of Scale Scores: Grade 7, Writing







Appendix A-8. Frequency Distribution of Scale Scores, Grade 8, Mathematics, All Students

Scale Scores	Frequency	Percent	Cumulative Frequency	Cumulative Percent	Scale Scores	Frequency	Percent	Cumulative Frequency	Cumulative Percent
300	317	0.61	317	0.61	344	21	0.04	814	1.56
301	8	0.02	325	0.62	345	15	0.03	829	1.59
302	5	0.01	330	0.63	346	18	0.03	847	1.62
303	7	0.01	337	0.65	347	22	0.04	869	1.66
304	9	0.02	346	0.66	348	14	0.03	883	1.69
305	5	0.01	351	0.67	349	20	0.04	903	1.73
306	10	0.02	361	0.69	350	29	0.06	932	1.78
307	8	0.02	369	0.71	351	25	0.05	957	1.83
308	4	0.01	373	0.71	352	28	0.05	985	1.89
309	5	0.01	378	0.72	353	33	0.06	1018	1.95
310	9	0.02	387	0.74	354	21	0.04	1039	1.99
311	9	0.02	396	0.76	355	27	0.05	1066	2.04
312	9	0.02	405	0.78	356	30	0.06	1096	2.10
313	8	0.02	413	0.79	357	25	0.05	1121	2.15
314	4	0.01	417	0.80	358	30	0.06	1151	2.20
315	10	0.02	427	0.82	359	20	0.04	1171	2.24
316	13	0.02	440	0.84	360	32	0.06	1203	2.30
317	9	0.02	449	0.86	361	42	0.08	1245	2.38
318	7	0.01	456	0.87	362	47	0.09	1292	2.47
319	10	0.02	466	0.89	363	30	0.06	1322	2.53
320	12	0.02	478	0.91	364	28	0.05	1350	2.58
321	9	0.02	487	0.93	365	39	0.07	1389	2.66
322	11	0.02	498	0.95	366	39	0.07	1428	2.73
323	14	0.03	512	0.98	367	29	0.06	1457	2.79
324	11	0.02	523	1.00	368	30	0.06	1487	2.85
325	15	0.03	538	1.03	369	36	0.07	1523	2.92
326	12	0.02	550	1.05	370	37	0.07	1560	2.99
327	9	0.02	559	1.07	371	45	0.09	1605	3.07
328	15	0.03	574	1.10	372	36	0.07	1641	3.14
329	8	0.02	582	1.11	373	48	0.09	1689	3.23
330	9	0.02	591	1.13	374	43	0.08	1732	3.32
331	15	0.03	606	1.16	375	35	0.07	1767	3.38
332	17	0.03	623	1.19	376	53	0.10	1820	3.48
333	18	0.03	641	1.23	377	53	0.10	1873	3.59
334	16	0.03	657	1.26	378	46	0.09	1919	3.67
335	17	0.03	674	1.29	379	58	0.11	1976	3.78
336	12	0.02	686	1.31	380	43	0.08	2019	3.86
337	22	0.04	708	1.36	381	48	0.09	2067	3.96
338	8	0.02	716	1.37	382	53	0.10	2120	4.06
339	17	0.03	733	1.40	383	52	0.10	2172	4.16
340	18	0.03	751	1.44	384	61	0.12	2233	4.27
341	13	0.02	764	1.46	385	51	0.10	2284	4.37
342	15	0.03	779	1.49	386	63	0.12	2347	4.49
343	14	0.03	793	1.52	387	52	0.10	2399	4.59

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Scale Score	Frequency	Percent	Cumulative Frequency	Cumulative Percent	Scale Score	Frequency	Percent	Cumulative Frequency	Cumulative Percent
388	48	0.09	2447	4.68	432	142	0.27	6770	12.96
389	67	0.13	2514	4.81	433	172	0.33	6942	13.29
390	52	0.10	2566	4.91	434	156	0.30	7097	13.58
391	60	0.11	2626	5.03	435	158	0.30	7255	13.89
392	71	0.14	2697	5.16	436	148	0.28	7403	14.17
393	75	0.14	2772	5.31	437	148	0.28	7551	14.45
394	74	0.14	2846	5.45	438	176	0.34	7727	14.79
395	81	0.16	2927	5.60	439	156	0.30	7883	15.09
396	70	0.13	2997	5.74	440	203	0.39	8086	15.48
397	67	0.13	3064	5.86	441	189	0.36	8275	15.84
398	94	0.18	3158	6.04	442	195	0.37	8470	16.21
399	74	0.14	3232	6.19	443	189	0.36	8659	16.57
400	76	0.15	3308	6.33	444	173	0.33	8832	16.91
401	82	0.16	3390	6.49	445	193	0.37	9025	17.28
402	61	0.12	3451	6.61	446	192	0.37	9217	17.64
403	88	0.17	3539	6.77	447	203	0.39	9420	18.03
404	76	0.15	3615	6.92	448	217	0.42	9637	18.45
405	92	0.18	3707	7.10	449	201	0.38	9838	18.83
406	91	0.17	3798	7.27	450	196	0.38	10034	19.21
407	97	0.19	3895	7.46	451	202	0.39	10236	19.59
408	79	0.15	3974	7.61	452	237	0.45	10473	20.05
409	90	0.17	4064	7.78	453	235	0.45	10708	20.50
410	104	0.20	4168	7.98	454	261	0.50	10969	21.00
411	92	0.18	4260	8.15	455	249	0.48	11218	21.47
412	93	0.18	4353	8.33	456	232	0.44	11450	21.92
413	91	0.17	4444	8.51	457	256	0.49	11706	22.41
414	100	0.19	4544	8.70	458	267	0.51	11973	22.92
415	102	0.20	4646	8.89	459	275	0.53	12248	23.44
416	114	0.22	4760	9.11	460	249	0.48	12497	23.92
417	107	0.20	4867	9.32	461	240	0.46	12737	24.38
418	121	0.23	4988	9.55	462	294	0.56	13031	24.94
419	121	0.23	5109	9.78	463	285	0.55	13316	25.49
420	115	0.22	5224	10.00	464	292	0.56	13608	26.05
421	112	0.21	5336	10.21	465	274	0.52	13882	26.57
422	119	0.23	5455	10.44	466	301	0.58	14183	27.15
423	110	0.21	5565	10.65	467	272	0.52	14455	27.67
424	124	0.24	5689	10.89	468	310	0.59	14765	28.26
425	127	0.24	5816	11.13	469	280	0.54	15045	28.80
426	112	0.21	5928	11.35	470	310	0.59	15355	29.39
427	150	0.29	6078	11.63	471	261	0.50	15616	29.89
428	126	0.24	6204	11.88	472	295	0.56	15911	30.46
429	153	0.29	6357	12.17	473	323	0.62	16234	31.07
430	131	0.25	6488	12.42	474	334	0.64	16568	31.71
431	140	0.27	6628	12.69	475	326	0.62	16894	32.34

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Scale Score	Frequency	Percent	Cumulative Frequency	Cumulative Percent	Scale Score	Frequency	Percent	Cumulative Frequency	Cumulative Percent
476	317	0.61	17211	32.94	520	394	0.75	34074	65.22
477	326	0.62	17537	33.57	521	369	0.71	34443	65.93
478	315	0.60	17852	34.17	522	395	0.76	34838	66.68
479	351	0.67	18203	34.84	523	386	0.74	35224	67.43
480	321	0.61	18524	35.46	524	348	0.67	35574	68.09
481	363	0.69	18887	36.15	525	369	0.71	35943	68.80
482	359	0.69	19246	36.84	526	369	0.71	36312	69.51
483	360	0.69	19606	37.53	527	371	0.71	36683	70.22
484	316	0.60	19922	38.13	528	398	0.76	37081	70.98
485	378	0.72	20298	38.85	529	342	0.65	37423	71.63
486	390	0.75	20688	39.60	530	379	0.73	37802	72.36
487	370	0.71	21058	40.31	531	385	0.74	38187	73.09
488	371	0.71	21429	41.02	532	375	0.72	38562	73.81
489	395	0.76	21824	41.77	533	351	0.67	38913	74.48
490	395	0.76	22219	42.53	534	339	0.65	39252	75.13
491	369	0.71	22588	43.24	535	355	0.68	39607	75.81
492	380	0.73	22968	43.96	536	321	0.61	39928	76.43
493	359	0.69	23327	44.65	537	378	0.72	40306	77.15
494	405	0.78	23732	45.43	538	318	0.61	40624	77.76
495	371	0.71	24103	46.14	539	349	0.67	40973	78.43
496	374	0.72	24477	46.85	540	337	0.65	41310	79.07
497	373	0.71	24850	47.57	541	336	0.64	41646	79.72
498	417	0.80	25267	48.36	542	318	0.61	41964	80.32
499	402	0.77	25669	49.13	543	300	0.57	42264	80.90
500	390	0.75	26059	49.88	544	303	0.58	42567	81.48
501	392	0.75	26451	50.63	545	336	0.64	42903	82.12
502	377	0.72	26828	51.35	546	300	0.57	43203	82.70
503	401	0.77	27229	52.12	547	290	0.56	43493	83.25
504	411	0.79	27640	52.91	548	262	0.50	43755	83.75
505	423	0.81	28063	53.72	549	258	0.49	44013	84.25
506	393	0.75	28456	54.47	550	260	0.50	44273	84.74
507	404	0.77	28860	55.24	551	252	0.48	44525	85.23
508	381	0.73	29241	55.97	552	250	0.48	44775	85.71
509	376	0.72	29617	56.69	553	251	0.48	45026	86.19
510	375	0.72	29992	57.41	554	249	0.48	45275	86.66
511	403	0.77	30395	58.18	555	226	0.43	45501	87.09
512	401	0.77	30796	58.95	556	237	0.45	45738	87.55
513	379	0.73	31175	59.67	557	227	0.43	45965	87.98
514	399	0.76	31574	60.44	558	220	0.42	46185	88.40
515	425	0.81	31999	61.25	559	206	0.39	46391	88.80
516	406	0.78	32405	62.03	560	200	0.38	46591	89.18
517	437	0.84	32842	62.86	561	225	0.43	46816	89.61
518	408	0.78	33250	63.64	562	193	0.37	47009	89.98
519	430	0.82	33680	64.47	563	228	0.44	47237	90.42

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Scale Scores	Frequency	Percent	Cumulative Frequency	Cumulative Percent	Scale Scores	Frequency	Percent	Cumulative Frequency	Cumulative Percent
564	194	0.37	47431	90.79	608	37	0.07	51710	98.98
565	186	0.36	47617	91.15	609	24	0.05	51734	99.03
566	168	0.32	47785	91.47	610	30	0.06	51764	99.08
567	174	0.33	47959	91.80	611	27	0.05	51791	99.13
568	181	0.35	48140	92.15	612	23	0.04	51814	99.18
569	169	0.32	48309	92.47	613	19	0.04	51833	99.22
570	172	0.33	48481	92.80	614	26	0.05	51859	99.26
571	167	0.32	48648	93.12	615	20	0.04	51879	99.30
572	151	0.29	48799	93.41	616	16	0.03	51895	99.33
573	150	0.29	48949	93.69	617	23	0.04	51918	99.38
574	137	0.26	49086	93.96	618	16	0.03	51934	99.41
575	149	0.29	49235	94.24	619	23	0.04	51957	99.45
576	132	0.25	49367	94.49	620	22	0.04	51979	99.49
577	135	0.26	49502	94.75	621	11	0.02	51990	99.52
578	131	0.25	49633	95.00	622	9	0.02	51999	99.53
579	128	0.25	49761	95.25	623	13	0.02	52012	99.56
580	102	0.20	49863	95.44	624	15	0.03	52027	99.59
581	86	0.16	49949	95.61	625	11	0.02	52038	99.61
582	107	0.20	50056	95.81	626	12	0.02	52050	99.63
583	112	0.21	50168	96.03	627	6	0.01	52056	99.64
584	96	0.18	50264	96.21	628	12	0.02	52067	99.66
585	106	0.20	50370	96.41	629	5	0.01	52072	99.67
586	97	0.19	50467	96.60	630	10	0.02	52082	99.69
587	97	0.19	50564	96.79	631	7	0.01	52089	99.71
588	75	0.14	50639	96.93	632	9	0.02	52098	99.72
589	86	0.16	50725	97.09	633	3	0.01	52101	99.73
590	65	0.12	50790	97.22	634	5	0.01	52106	99.74
591	71	0.14	50861	97.35	635	5	0.01	52111	99.75
592	85	0.16	50946	97.52	636	6	0.01	52117	99.76
593	59	0.11	51005	97.63	637	6	0.01	52123	99.77
594	68	0.13	51073	97.76	638	5	0.01	52128	99.78
595	70	0.13	51143	97.89	639	5	0.01	52133	99.79
596	66	0.13	51209	98.02	640	1	0.00	52134	99.79
597	52	0.10	51261	98.12	641	3	0.01	52137	99.80
598	49	0.09	51310	98.21	642	4	0.01	52141	99.80
599	44	0.08	51354	98.30	643	4	0.01	52145	99.81
600	53	0.10	51407	98.40	644	4	0.01	52149	99.82
601	42	0.08	51449	98.48	645	5	0.01	52154	99.83
602	31	0.06	51480	98.54	646	7	0.01	52161	99.84
603	29	0.06	51509	98.60	647	2	0.00	52163	99.85
604	39	0.07	51548	98.67	648	3	0.01	52166	99.85
605	41	0.08	51589	98.75	649	4	0.01	52170	99.86
606	41	0.08	51630	98.83	650	2	0.00	52172	99.86
607	43	0.08	51673	98.91	651	2	0.00	52174	99.87

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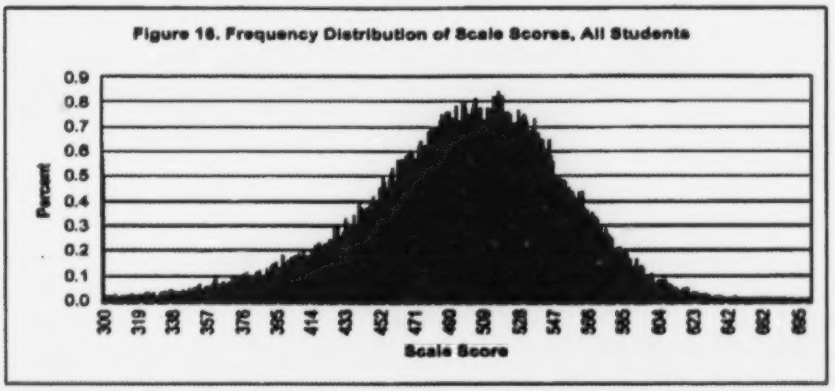
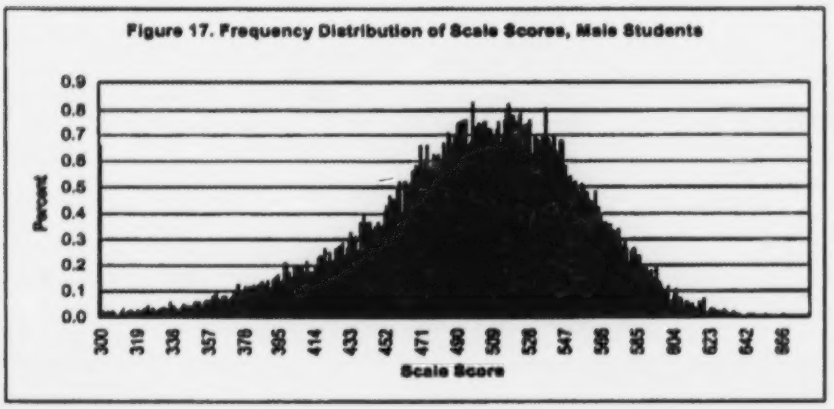
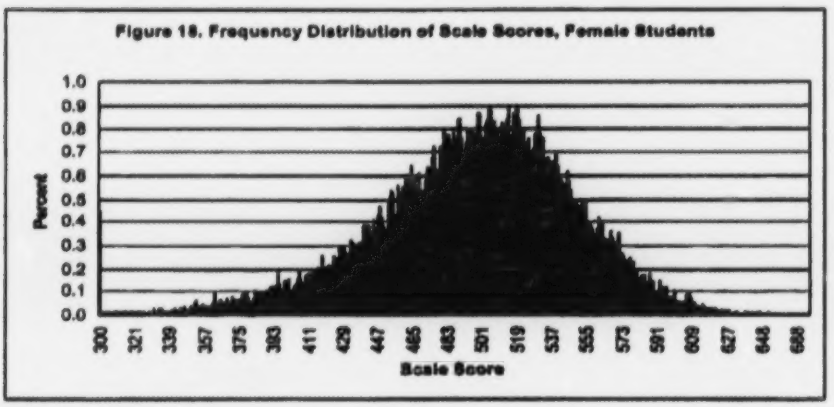
Scale Scores	Frequency	Percent	Cumulative Frequency	Cumulative Percent	Scale Scores	Frequency	Percent	Cumulative Frequency	Cumulative Percent
652	3	0.01	52177	99.87	673	1	0.00	52213	99.94
653	1	0.00	52178	99.88	674	4	0.01	52217	99.95
654	3	0.01	52181	99.88	675	2	0.00	52219	99.95
656	2	0.00	52183	99.89	677	2	0.00	52221	99.96
657	2	0.00	52185	99.89	678	1	0.00	52222	99.96
658	1	0.00	52186	99.89	682	1	0.00	52223	99.96
659	3	0.01	52189	99.90	687	2	0.00	52225	99.97
660	1	0.00	52190	99.90	688	1	0.00	52226	99.97
661	2	0.00	52192	99.90	689	1	0.00	52227	99.97
662	2	0.00	52194	99.91	692	1	0.00	52228	99.97
663	2	0.00	52196	99.91	695	1	0.00	52229	99.97
664	3	0.01	52199	99.92	696	1	0.00	52230	99.98
665	1	0.00	52200	99.92	698	2	0.00	52232	99.98
666	4	0.01	52204	99.93	703	1	0.00	52233	99.98
668	1	0.00	52205	99.93	704	3	0.01	52236	99.99
670	2	0.00	52207	99.93	706	1	0.00	52237	99.99
671	3	0.01	52210	99.94	736	1	0.00	52238	99.99
672	2	0.00	52212	99.94	760	5	0.01	52243	100.00

Figures 16-18. Frequency Distributions of Scale Scores: Grade 8, Mathematics







Appendix A-7. Frequency Distribution of Scale Scores, Grade 8, Science, All Students

Scale Scores	Frequency	Percent	Cumulative Frequency	Cumulative Percent	Scale Scores	Frequency	Percent	Cumulative Frequency	Cumulative Percent
300	203	0.39	203	0.39	345	19	0.04	617	1.19
301	2	0.00	205	0.39	346	11	0.02	628	1.21
302	7	0.01	212	0.41	347	15	0.03	643	1.24
303	4	0.01	216	0.42	348	19	0.04	662	1.27
304	8	0.02	224	0.43	349	20	0.04	682	1.31
305	8	0.02	232	0.45	350	20	0.04	702	1.35
306	10	0.02	242	0.47	351	24	0.05	726	1.40
307	4	0.01	246	0.47	352	18	0.03	744	1.43
308	6	0.01	252	0.48	353	27	0.05	771	1.48
309	5	0.01	257	0.49	354	20	0.04	791	1.52
310	5	0.01	262	0.50	355	17	0.03	808	1.56
312	4	0.01	266	0.51	356	30	0.06	838	1.61
313	5	0.01	271	0.52	357	25	0.05	863	1.66
314	8	0.02	279	0.54	358	21	0.04	884	1.70
315	2	0.00	281	0.54	359	26	0.05	910	1.75
316	5	0.01	286	0.55	360	27	0.05	937	1.80
317	6	0.01	292	0.56	361	21	0.04	958	1.84
318	4	0.01	296	0.57	362	23	0.04	981	1.89
319	7	0.01	303	0.58	363	36	0.07	1017	1.96
320	8	0.02	311	0.60	364	25	0.05	1042	2.00
321	10	0.02	321	0.62	365	39	0.08	1081	2.08
322	7	0.01	328	0.63	366	31	0.06	1112	2.14
323	8	0.02	336	0.65	367	27	0.05	1139	2.19
324	10	0.02	346	0.67	368	25	0.05	1164	2.24
325	8	0.02	354	0.68	369	41	0.08	1205	2.32
326	9	0.02	363	0.70	370	21	0.04	1226	2.36
327	9	0.02	372	0.72	371	29	0.06	1255	2.41
328	5	0.01	377	0.73	372	37	0.07	1292	2.49
329	12	0.02	389	0.75	373	36	0.07	1328	2.55
330	14	0.03	403	0.78	374	24	0.05	1352	2.60
331	19	0.04	422	0.81	375	32	0.06	1384	2.66
332	11	0.02	433	0.83	376	32	0.06	1416	2.72
333	16	0.03	449	0.86	377	37	0.07	1453	2.79
334	16	0.03	465	0.89	378	36	0.07	1489	2.86
335	16	0.03	481	0.93	379	42	0.08	1531	2.95
336	13	0.03	494	0.95	380	48	0.09	1579	3.04
337	17	0.03	511	0.98	381	51	0.10	1630	3.14
338	13	0.03	524	1.01	382	51	0.10	1681	3.23
339	5	0.01	529	1.02	383	58	0.11	1739	3.35
340	12	0.02	541	1.04	384	64	0.12	1803	3.47
341	14	0.03	555	1.07	385	45	0.09	1848	3.55
342	14	0.03	569	1.09	386	63	0.12	1911	3.68
343	20	0.04	589	1.13	387	55	0.11	1966	3.78
344	9	0.02	598	1.15	388	55	0.11	2021	3.89

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Scale Scores	Frequency	Percent	Cumulative Frequency	Cumulative Percent	Scale Scores	Frequency	Percent	Cumulative Frequency	Cumulative Percent
389	60	0.12	2081	4.00	433	150	0.29	6490	12.48
390	53	0.10	2134	4.10	434	172	0.33	6662	12.81
391	67	0.13	2201	4.23	435	156	0.30	6818	13.12
392	63	0.12	2264	4.36	436	163	0.31	6981	13.43
393	77	0.15	2341	4.50	437	179	0.34	7160	13.77
394	57	0.11	2398	4.61	438	149	0.29	7309	14.06
395	65	0.13	2463	4.74	439	177	0.34	7486	14.40
396	70	0.13	2533	4.87	440	162	0.31	7648	14.71
397	69	0.13	2602	5.01	441	170	0.33	7818	15.04
398	71	0.14	2673	5.14	442	172	0.33	7990	15.37
399	75	0.14	2748	5.29	443	196	0.38	8186	15.75
400	69	0.13	2817	5.42	444	203	0.39	8389	16.14
401	83	0.16	2900	5.58	445	194	0.37	8583	16.51
402	75	0.14	2975	5.72	446	190	0.37	8773	16.88
403	80	0.15	3055	5.88	447	193	0.37	8966	17.25
404	72	0.14	3127	6.02	448	209	0.40	9175	17.65
405	88	0.17	3215	6.18	449	234	0.45	9409	18.10
406	92	0.18	3307	6.36	450	209	0.40	9618	18.50
407	85	0.16	3392	6.52	451	228	0.44	9846	18.94
408	78	0.15	3470	6.67	452	242	0.47	10088	19.41
409	94	0.18	3564	6.86	453	216	0.42	10304	19.82
410	99	0.19	3663	7.05	454	230	0.44	10534	20.26
411	92	0.18	3755	7.22	455	235	0.45	10769	20.72
412	108	0.21	3863	7.43	456	264	0.51	11033	21.22
413	91	0.18	3954	7.61	457	239	0.46	11272	21.68
414	104	0.20	4058	7.81	458	242	0.47	11514	22.15
415	92	0.18	4150	7.98	459	256	0.49	11770	22.64
416	119	0.23	4269	8.21	460	232	0.45	12002	23.09
417	93	0.18	4362	8.39	461	275	0.53	12277	23.62
418	105	0.20	4467	8.59	462	262	0.50	12539	24.12
419	107	0.21	4574	8.80	463	279	0.54	12818	24.66
420	127	0.24	4701	9.04	464	291	0.56	13109	25.22
421	122	0.23	4823	9.28	465	281	0.54	13390	25.76
422	112	0.22	4935	9.49	466	272	0.52	13662	26.28
423	117	0.23	5052	9.72	467	284	0.55	13946	26.83
424	124	0.24	5176	9.96	468	295	0.57	14241	27.39
425	132	0.25	5308	10.21	469	315	0.61	14556	28.00
426	150	0.29	5456	10.50	470	285	0.55	14841	28.55
427	155	0.30	5613	10.80	471	284	0.55	15125	29.09
428	123	0.24	5736	11.03	472	325	0.63	15450	29.72
429	124	0.24	5860	11.27	473	289	0.56	15739	30.28
430	148	0.28	6008	11.56	474	301	0.58	16040	30.85
431	163	0.31	6171	11.87	475	329	0.63	16369	31.49
432	169	0.33	6340	12.20	476	302	0.58	16671	32.07

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Continue.....

Scale Scores	Frequency	Percent	Cumulative Frequency	Cumulative Percent	Scale Scores	Frequency	Percent	Cumulative Frequency	Cumulative Percent
477	330	0.83	17001	32.70	521	379	0.73	33967	65.38
478	310	0.60	17311	33.30	522	361	0.69	34348	66.07
479	347	0.67	17658	33.97	523	384	0.74	34732	66.81
480	357	0.69	18015	34.65	524	389	0.75	35121	67.56
481	354	0.68	18369	35.33	525	415	0.80	35536	68.36
482	367	0.71	18736	36.04	526	387	0.74	35923	69.10
483	355	0.68	19091	36.72	527	356	0.68	36279	69.79
484	355	0.68	19446	37.41	528	370	0.71	36649	70.50
485	343	0.66	19789	38.07	529	368	0.71	37017	71.21
486	362	0.70	20151	38.76	530	351	0.68	37368	71.88
487	390	0.75	20541	39.51	531	340	0.65	37708	72.53
488	358	0.69	20899	40.20	532	379	0.73	38087	73.26
489	383	0.74	21282	40.94	533	363	0.70	38450	73.96
490	368	0.71	21650	41.65	534	365	0.70	38815	74.66
491	369	0.71	22019	42.36	535	351	0.68	39166	75.34
492	392	0.75	22411	43.11	536	366	0.70	39532	76.04
493	356	0.68	22767	43.79	537	348	0.67	39880	76.71
494	395	0.76	23162	44.55	538	320	0.62	40200	77.33
495	399	0.77	23561	45.32	539	346	0.67	40546	77.99
496	393	0.76	23954	46.08	540	303	0.58	40849	78.58
497	383	0.74	24337	46.81	541	314	0.60	41163	79.18
498	435	0.84	24772	47.65	542	333	0.64	41496	79.82
499	369	0.71	25141	48.36	543	278	0.53	41774	80.36
500	390	0.75	25531	49.11	544	324	0.62	42098	80.98
501	383	0.74	25914	49.85	545	325	0.63	42423	81.60
502	425	0.82	26339	50.67	546	282	0.54	42705	82.15
503	379	0.73	26718	51.39	547	280	0.54	42985	82.69
504	411	0.79	27129	52.19	548	280	0.54	43265	83.22
505	391	0.75	27520	52.94	549	274	0.53	43539	83.75
506	433	0.83	27953	53.77	550	287	0.55	43826	84.30
507	429	0.83	28382	54.60	551	271	0.52	44097	84.82
508	417	0.80	28799	55.40	552	259	0.50	44356	85.32
509	404	0.78	29203	56.17	553	266	0.51	44622	85.83
510	380	0.73	29583	56.91	554	237	0.46	44859	86.29
511	409	0.79	29992	57.69	555	260	0.50	45119	86.79
512	395	0.76	30387	58.45	556	218	0.42	45337	87.21
513	424	0.82	30811	59.27	557	252	0.48	45589	87.69
514	426	0.82	31237	60.09	558	205	0.39	45794	88.09
515	381	0.73	31618	60.82	559	208	0.40	46002	88.49
516	427	0.82	32045	61.64	560	207	0.40	46209	88.89
517	366	0.70	32411	62.35	561	201	0.39	46410	89.27
518	387	0.74	32798	63.09	562	199	0.38	46609	89.66
519	413	0.79	33211	63.88	563	213	0.41	46822	90.07
520	397	0.76	33608	64.65	564	192	0.37	47014	90.44

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Continue.....

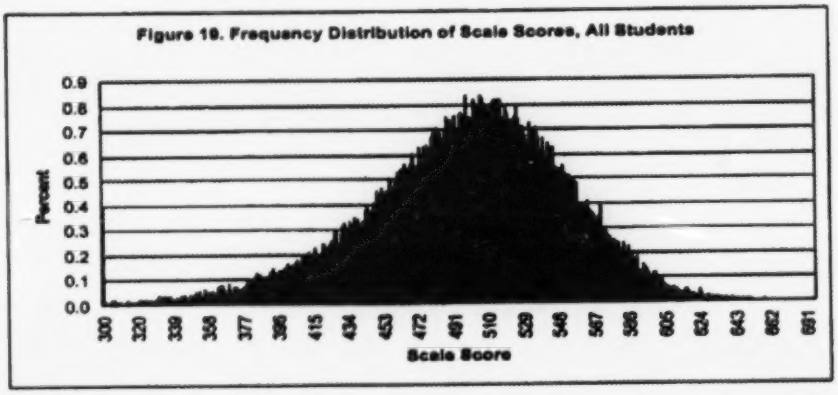
Scale Scores	Frequency	Percent	Cumulative Frequency	Cumulative Percent	Scale Scores	Frequency	Percent	Cumulative Frequency	Cumulative Percent
565	189	0.36	47203	90.80	609	30	0.06	51405	98.88
566	185	0.36	47388	91.16	610	28	0.05	51433	98.94
567	180	0.35	47568	91.50	611	29	0.06	51462	98.99
568	173	0.33	47741	91.83	612	23	0.04	51485	99.04
569	182	0.35	47923	92.18	613	20	0.04	51505	99.07
570	204	0.39	48127	92.58	614	19	0.04	51524	99.11
571	149	0.29	48276	92.86	615	25	0.05	51549	99.16
572	153	0.29	48429	93.16	616	27	0.05	51576	99.21
573	152	0.29	48581	93.45	617	22	0.04	51598	99.25
574	141	0.27	48722	93.72	618	18	0.03	51616	99.29
575	136	0.26	48858	93.98	619	16	0.03	51632	99.32
576	130	0.25	48988	94.23	620	16	0.03	51648	99.35
577	132	0.25	49120	94.49	621	15	0.03	51663	99.38
578	120	0.23	49240	94.72	622	13	0.03	51676	99.40
579	125	0.24	49365	94.96	623	24	0.05	51700	99.45
580	122	0.23	49487	95.19	624	19	0.04	51719	99.49
581	109	0.21	49596	95.40	625	11	0.02	51730	99.51
582	99	0.19	49695	95.59	626	12	0.02	51742	99.53
583	124	0.24	49819	95.83	627	8	0.02	51750	99.55
584	95	0.18	49914	96.01	628	14	0.03	51764	99.57
585	117	0.23	50031	96.24	629	10	0.02	51774	99.59
586	88	0.17	50119	96.41	630	9	0.02	51783	99.61
587	98	0.19	50217	96.60	631	10	0.02	51793	99.63
588	90	0.17	50307	96.77	632	6	0.01	51799	99.64
589	79	0.15	50386	96.92	633	11	0.02	51810	99.66
590	94	0.18	50480	97.10	634	5	0.01	51815	99.67
591	65	0.13	50545	97.23	635	8	0.02	51823	99.69
592	56	0.11	50601	97.34	636	6	0.01	51829	99.70
593	79	0.15	50680	97.49	637	8	0.02	51837	99.71
594	72	0.14	50752	97.63	638	5	0.01	51842	99.72
595	69	0.13	50821	97.76	639	6	0.01	51848	99.73
596	61	0.12	50882	97.88	640	4	0.01	51852	99.74
597	49	0.09	50931	97.97	641	8	0.02	51860	99.76
598	40	0.08	50971	98.05	642	4	0.01	51864	99.77
599	62	0.12	51033	98.17	643	5	0.01	51869	99.77
600	50	0.10	51083	98.26	644	5	0.01	51874	99.78
601	47	0.09	51130	98.35	645	4	0.01	51878	99.79
602	39	0.08	51169	98.43	646	6	0.01	51884	99.80
603	47	0.09	51216	98.52	647	3	0.01	51887	99.81
604	38	0.07	51254	98.59	648	5	0.01	51892	99.82
605	33	0.06	51287	98.66	649	5	0.01	51897	99.83
606	30	0.06	51317	98.71	650	7	0.01	51904	99.84
607	29	0.06	51346	98.77	651	5	0.01	51909	99.85
608	29	0.06	51375	98.82	652	4	0.01	51913	99.86

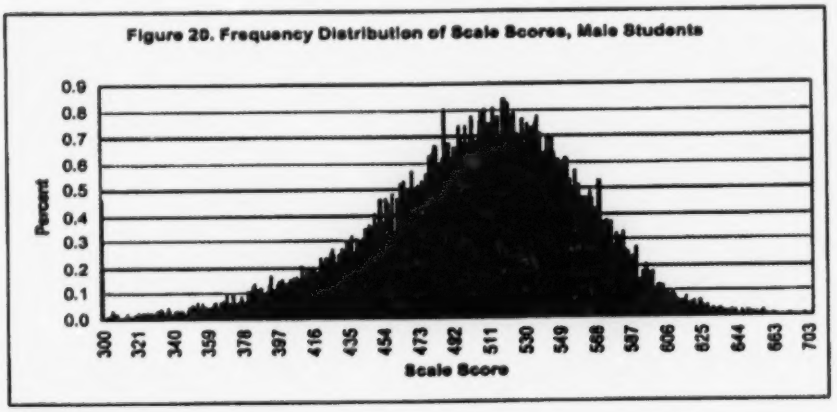
Continue.....

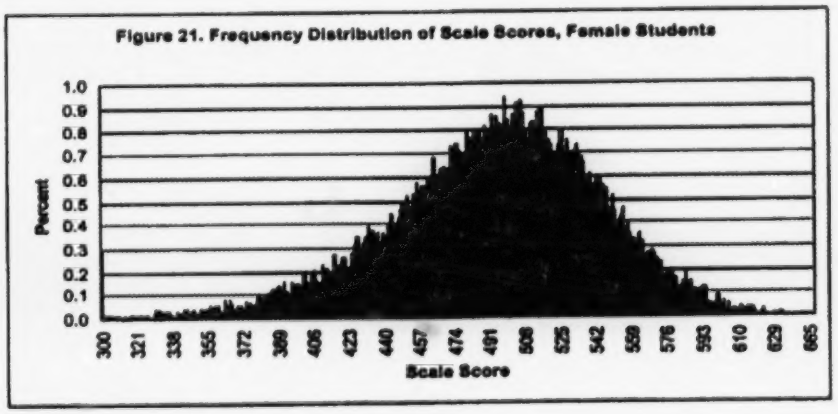
Continue....

Scale Scores	Frequency	Percent	Cumulative Frequency	Cumulative Percent	Scale Scores	Frequency	Percent	Cumulative Frequency	Cumulative Percent
653	2	0.00	51915	99.86	671	2	0.00	51963	99.96
654	4	0.01	51919	99.87	675	2	0.00	51965	99.96
655	3	0.01	51922	99.88	676	3	0.01	51968	99.97
656	3	0.01	51925	99.88	677	1	0.00	51969	99.97
657	4	0.01	51929	99.89	678	2	0.00	51971	99.97
658	6	0.01	51935	99.90	680	2	0.00	51973	99.97
659	3	0.01	51938	99.91	681	1	0.00	51974	99.98
660	2	0.00	51940	99.91	682	1	0.00	51975	99.98
661	3	0.01	51943	99.92	683	1	0.00	51976	99.98
662	3	0.01	51946	99.92	686	1	0.00	51977	99.98
663	2	0.00	51948	99.93	687	3	0.01	51980	99.99
664	4	0.01	51952	99.93	691	1	0.00	51981	99.99
665	2	0.00	51954	99.94	699	1	0.00	51982	99.99
666	2	0.00	51956	99.94	703	1	0.00	51983	99.99
667	2	0.00	51958	99.95	726	2	0.00	51985	100.00
668	1	0.00	51959	99.95	790	1	0.00	51986	100.00
669	2	0.00	51961	99.95					

Figures 19 – 21. Frequency Distributions of Scale Scores: Grade 8, Science







Appendix B-1. Differential Item Functioning Analysis, Grade 3, Reading, Male (N=23,279)

Item	Type	Z	D+	D-	O	P	D	Item	Type	Z	D+	D-	O	P	D
1	MC	-4.10	0.00	-0.01	0.80	0.81	-0.01	22	CR	-1.65	0.04	-0.05	3.77	3.78	-0.01
2	MC	-1.91	0.01	0.00	0.96	0.96	0.00	23	MC	-4.90	0.00	-0.02	0.71	0.72	-0.01
3	CR	0.18	0.01	-0.01	2.87	2.86	0.00	24	MC	-1.13	0.00	0.00	0.91	0.91	0.00
4	MC	-2.88	0.00	-0.01	0.84	0.85	-0.01	25	MC	-1.31	0.00	-0.01	0.88	0.88	0.00
5	CR	-6.30	0.04	-0.03	2.55	2.57	-0.02	26	MC	1.40	0.00	-0.01	0.84	0.84	0.00
6	MC	10.98	0.02	0.00	0.88	0.86	0.02	27	MC	-1.53	0.00	-0.01	0.76	0.77	-0.01
7	MC	7.28	0.02	-0.01	0.68	0.66	0.02	28	MC	-0.82	0.00	-0.01	0.86	0.86	0.00
8	MC	3.84	0.01	-0.01	0.64	0.63	0.01	29	MC	-2.41	0.00	-0.01	0.83	0.83	-0.01
9	MC	4.50	0.02	-0.01	0.61	0.60	0.01	30	CR	-5.16	0.00	-0.02	2.41	2.43	-0.02
10	MC	-4.66	0.01	-0.02	0.80	0.82	-0.01	31	MC	7.47	0.02	0.00	0.85	0.83	0.02
11	MC	7.33	0.02	-0.01	0.70	0.67	0.02	32	CR	-1.32	0.01	-0.01	2.07	2.07	0.00
12	MC	-4.13	0.01	-0.02	0.61	0.62	-0.01	33	MC	3.78	0.01	0.00	0.88	0.86	0.01
13	MC	0.93	0.00	-0.01	0.82	0.82	0.00	34	MC	-4.93	0.00	-0.02	0.71	0.72	-0.01
14	MC	-4.09	0.02	-0.04	0.55	0.56	-0.01	35	MC	8.38	0.02	0.00	0.68	0.66	0.02
15	MC	1.30	0.01	0.00	0.79	0.78	0.00	36	CR	-2.03	0.04	-0.06	2.02	2.02	-0.01
16	MC	5.39	0.02	0.00	0.76	0.74	0.01	37	CR	-0.29	0.02	-0.01	3.77	3.76	0.01
17	MC	2.01	0.01	0.00	0.86	0.86	0.01	38	MC	0.83	0.01	-0.01	0.85	0.85	0.00
18	MC	-1.06	0.02	-0.03	0.53	0.54	-0.01	39	MC	-2.38	0.01	-0.02	0.74	0.75	-0.01
19	CR	-6.46	0.03	-0.08	1.78	1.80	-0.04	40	MC	-0.87	0.01	-0.01	0.72	0.72	0.00
20	MC	7.08	0.02	0.00	0.79	0.77	0.02	41	CR	-2.69	0.02	-0.01	2.86	2.85	0.00
21	MC	-6.25	0.00	-0.02	0.57	0.59	-0.02								

Appendix B-2. Differential Item Functioning Analysis, Grade 3, Reading, Female (N=22,780)

Item	Type	Z	D+	D-	O	P	D	Item	Type	Z	D+	D-	O	P	D
1	MC	4.57	0.01	0.00	0.84	0.83	0.01	22	CR	2.05	0.04	-0.04	3.89	3.88	0.01
2	MC	0.23	0.01	0.00	0.97	0.97	0.00	23	MC	5.33	0.01	-0.01	0.76	0.75	0.01
3	CR	8.99	0.01	0.00	2.91	2.89	0.01	24	MC	4.61	0.01	0.00	0.93	0.93	0.01
4	MC	5.76	0.01	0.00	0.88	0.87	0.01	25	MC	6.12	0.01	0.00	0.91	0.90	0.01
5	CR	5.61	0.02	0.00	2.64	2.61	0.02	26	MC	3.70	0.01	-0.01	0.87	0.87	0.01
6	MC	-10.15	0.00	-0.02	0.80	0.80	-0.02	27	MC	2.73	0.01	0.00	0.80	0.79	0.01
7	MC	-8.53	0.00	-0.04	0.66	0.69	-0.03	28	MC	2.26	0.01	0.00	0.89	0.88	0.01
8	MC	-4.87	0.00	-0.02	0.65	0.67	-0.02	29	MC	6.52	0.01	0.00	0.87	0.86	0.01
9	MC	-7.81	0.01	-0.03	0.59	0.61	-0.03	30	CR	5.01	0.03	-0.01	2.52	2.50	0.02
10	MC	4.98	0.01	0.00	0.84	0.83	0.01	31	MC	-9.33	0.00	-0.03	0.63	0.66	-0.03
11	MC	-9.20	0.00	-0.03	0.67	0.70	-0.03	32	CR	-5.47	0.01	-0.02	2.10	2.12	-0.02
12	MC	1.87	0.01	-0.01	0.65	0.64	0.00	33	MC	-1.63	0.01	0.00	0.90	0.90	0.00
13	MC	3.23	0.01	-0.01	0.85	0.85	0.00	34	MC	4.51	0.01	0.00	0.76	0.75	0.01
14	MC	-0.88	0.03	-0.05	0.58	0.58	0.00	35	MC	-6.74	0.01	-0.03	0.67	0.69	-0.02
15	MC	1.75	0.01	-0.01	0.82	0.81	0.00	36	CR	-4.79	0.01	-0.04	2.05	2.07	-0.02
16	MC	-4.65	0.00	-0.01	0.76	0.77	-0.01	37	CR	2.09	0.03	-0.01	3.82	3.81	0.02
17	MC	-1.36	0.00	0.00	0.89	0.90	0.00	38	MC	0.25	0.01	-0.01	0.87	0.87	0.00
18	MC	-2.71	0.01	-0.03	0.58	0.57	-0.01	39	MC	3.30	0.01	-0.01	0.78	0.77	0.01
19	CR	1.85	0.02	-0.03	1.85	1.85	0.00	40	MC	-0.93	0.01	-0.01	0.73	0.73	0.00
20	MC	-5.44	0.01	-0.02	0.78	0.80	-0.02	41	CR	1.26	0.03	0.00	2.89	2.88	0.01
21	MC	3.39	0.02	-0.01	0.62	0.62	0.01								

Appendix B-3. Differential Item Functioning Analysis, Grade 3, Reading, African American (N=2495)

Item	Type	Z	D+	D-	O	P	D	Item	Type	Z	D+	D-	O	P	D
1	MC	-2.85	0.00	-0.02	0.72	0.74	-0.02	22	CR	-1.43	0.09	-0.07	3.37	3.40	-0.04
2	MC	0.57	0.01	0.00	0.94	0.93	0.01	23	MC	-1.71	0.02	-0.02	0.81	0.82	-0.01
3	CR	0.51	0.02	-0.03	2.78	2.78	0.00	24	MC	4.84	0.03	0.00	0.89	0.86	0.03
4	MC	3.05	0.02	-0.01	0.79	0.77	0.02	25	MC	3.47	0.03	0.00	0.84	0.82	0.02
5	CR	-1.60	0.02	-0.04	2.41	2.42	-0.02	26	MC	2.12	0.03	-0.01	0.77	0.75	0.02
6	MC	-0.59	0.01	-0.01	0.79	0.79	0.00	27	MC	-1.07	0.01	-0.03	0.86	0.87	-0.01
7	MC	2.33	0.03	-0.02	0.59	0.57	0.02	28	MC	0.83	0.03	-0.01	0.80	0.79	0.01
8	MC	1.07	0.02	-0.01	0.52	0.51	0.01	29	MC	1.78	0.02	-0.04	0.75	0.74	0.01
9	MC	1.03	0.04	-0.03	0.54	0.53	0.01	30	CR	1.89	0.05	-0.02	2.20	2.18	0.03
10	MC	-2.09	0.02	-0.04	0.73	0.75	-0.02	31	MC	-1.60	0.01	-0.03	0.51	0.53	-0.02
11	MC	-3.12	0.02	-0.04	0.56	0.59	-0.03	32	CR	0.35	0.05	-0.03	1.90	1.89	0.00
12	MC	-4.64	0.00	-0.04	0.48	0.53	-0.04	33	MC	1.85	0.03	-0.01	0.82	0.81	0.02
13	MC	-2.63	0.00	-0.03	0.70	0.72	-0.02	34	MC	-0.19	0.01	-0.03	0.82	0.82	0.00
14	MC	0.47	0.04	-0.05	0.52	0.51	0.01	35	MC	2.34	0.04	-0.02	0.58	0.56	0.02
15	MC	-1.23	0.03	-0.04	0.66	0.68	-0.02	36	CR	-0.72	0.04	-0.03	1.85	1.85	0.00
16	MC	2.59	0.02	-0.01	0.84	0.83	0.02	37	CR	2.67	0.05	-0.05	3.66	3.63	0.03
17	MC	0.17	0.01	-0.02	0.82	0.82	0.00	38	MC	2.16	0.02	-0.01	0.78	0.77	0.01
18	MC	-2.64	0.09	-0.06	0.40	0.43	-0.03	39	MC	1.60	0.02	-0.06	0.67	0.66	0.01
19	CR	-3.33	0.07	-0.08	1.55	1.61	-0.06	40	MC	-0.51	0.02	-0.02	0.66	0.67	-0.01
20	MC	-4.86	0.02	-0.05	0.62	0.67	-0.04	41	CR	3.29	0.04	-0.01	2.80	2.78	0.03
21	MC	-3.04	0.01	-0.03	0.45	0.48	-0.03								

Appendix B-4. Differential Item Functioning Analysis, Grade 3, Reading, Hispanic (N=7334)

Item	Type	Z	D+	D-	O	P	D	Item	Type	Z	D+	D-	O	P	D
1	MC	1.41	0.02	-0.02	0.75	0.75	0.01	22	CR	-1.43	0.03	-0.06	3.39	3.41	-0.02
2	MC	3.46	0.02	0.00	0.94	0.93	0.01	23	MC	-2.08	0.01	-0.02	0.81	0.82	-0.01
3	CR	2.09	0.02	-0.01	2.79	2.78	0.01	24	MC	3.18	0.02	-0.01	0.87	0.86	0.01
4	MC	-1.21	0.01	-0.02	0.76	0.77	-0.01	25	MC	-1.11	0.00	-0.01	0.81	0.82	-0.01
5	CR	1.61	0.04	-0.04	2.44	2.43	0.02	26	MC	-1.63	0.00	-0.01	0.74	0.75	-0.01
6	MC	1.51	0.02	-0.02	0.80	0.79	0.01	27	MC	-3.52	0.01	-0.02	0.66	0.68	-0.02
7	MC	0.49	0.02	-0.02	0.57	0.57	0.00	28	MC	3.67	0.02	-0.01	0.81	0.79	0.01
8	MC	-1.12	0.02	-0.03	0.51	0.52	-0.01	29	MC	6.55	0.03	0.00	0.77	0.74	0.03
9	MC	0.33	0.03	-0.02	0.53	0.53	0.00	30	CR	1.51	0.04	-0.03	2.20	2.18	0.01
10	MC	0.29	0.02	-0.02	0.76	0.76	0.00	31	MC	-6.92	0.01	-0.04	0.50	0.53	-0.04
11	MC	0.99	0.02	-0.01	0.60	0.59	0.01	32	CR	-2.74	0.02	-0.02	1.89	1.90	-0.02
12	MC	-6.01	0.00	-0.05	0.49	0.53	-0.05	33	MC	3.75	0.02	0.00	0.82	0.81	0.01
13	MC	-1.18	0.01	-0.02	0.72	0.73	-0.01	34	MC	-0.21	0.02	-0.01	0.62	0.63	0.00
14	MC	6.83	0.07	-0.06	0.55	0.51	0.04	35	MC	-0.13	0.00	-0.01	0.56	0.56	0.00
15	MC	2.70	0.01	-0.01	0.69	0.68	0.01	36	CR	0.06	0.04	-0.05	1.86	1.86	0.01
16	MC	-0.28	0.02	-0.02	0.63	0.63	0.00	37	CR	4.08	0.07	-0.02	3.68	3.63	0.05
17	MC	-1.23	0.01	-0.01	0.81	0.82	-0.01	38	MC	2.87	0.02	-0.01	0.78	0.77	0.01
18	MC	-2.95	0.06	-0.04	0.42	0.43	-0.02	39	MC	0.99	0.02	-0.02	0.67	0.66	0.01
19	CR	0.76	0.04	-0.06	1.61	1.61	-0.01	40	MC	-0.76	0.02	-0.02	0.67	0.67	0.00
20	MC	-5.97	0.01	-0.05	0.63	0.67	-0.04	41	CR	4.73	0.04	-0.01	2.80	2.78	0.03
21	MC	0.85	0.02	-0.02	0.49	0.48	0.00								

Appendix B-5. Differential Item Functioning Analysis, Grade 4, Reading, Male (N=20,498)

Item	Type	Z	D+	D-	O	P	D	Item	Type	Z	D+	D-	O	P	D
1	MC	1.83	0.00	0.00	0.91	0.91	0.00	36	MC	8.52	0.02	0.00	0.79	0.77	0.02
2	MC	5.22	0.02	0.00	0.83	0.81	0.02	37	CR	2.73	0.01	0.00	2.49	2.48	0.01
3	MC	2.21	0.01	0.00	0.69	0.69	0.00	38	MC	-1.80	0.01	-0.01	0.70	0.70	-0.01
4	MC	2.85	0.01	-0.01	0.84	0.83	0.00	39	MC	-2.23	0.00	-0.01	0.77	0.78	-0.01
5	MC	-2.92	0.02	-0.02	0.35	0.35	-0.01	40	MC	-1.17	0.01	-0.01	0.72	0.73	-0.01
6	MC	-0.18	0.00	-0.01	0.87	0.87	0.00	41	MC	-3.01	0.01	-0.02	0.44	0.46	-0.01
7	MC	0.78	0.00	0.00	0.92	0.92	0.00	42	MC	-1.14	0.01	-0.01	0.75	0.75	0.00
8	MC	2.99	0.00	0.00	0.89	0.88	0.00	43	MC	-1.83	0.01	-0.01	0.63	0.63	-0.01
9	MC	1.24	0.02	-0.01	0.74	0.74	0.00	44	MC	-3.07	0.00	-0.01	0.74	0.75	-0.01
10	MC	-1.63	0.01	0.00	0.90	0.90	0.00	45	MC	3.08	0.01	0.00	0.93	0.93	0.01
11	CR	-2.45	0.02	-0.02	2.39	2.40	-0.01	46	MC	2.37	0.01	-0.01	0.91	0.91	0.01
12	MC	-2.40	0.00	-0.01	0.83	0.83	-0.01	47	MC	-1.95	0.01	-0.01	0.80	0.80	0.00
13	MC	4.89	0.01	0.00	0.86	0.85	0.01	48	MC	7.40	0.03	-0.01	0.46	0.44	0.03
14	CR	-4.96	0.00	-0.02	1.98	2.00	-0.02	49	MC	5.31	0.03	-0.02	0.32	0.31	0.02
15	MC	3.84	0.01	0.00	0.74	0.73	0.01	50	MC	2.78	0.01	0.00	0.75	0.74	0.00
16	MC	-0.03	0.01	-0.01	0.51	0.51	0.00	51	MC	6.35	0.01	-0.01	0.82	0.81	0.01
17	CR	-3.00	0.02	-0.04	1.94	1.95	-0.01	52	MC	0.77	0.01	-0.01	0.75	0.75	0.01
18	MC	4.22	0.01	0.00	0.83	0.82	0.01	87	CR	-9.03	0.01	-0.03	1.50	1.53	-0.03
19	MC	1.76	0.01	-0.01	0.70	0.70	0.00	88	MC	-0.69	0.01	-0.01	0.72	0.72	0.00
20	CR	-9.54	0.01	-0.07	1.83	1.86	-0.04	89	CR	-1.47	0.01	-0.06	4.43	4.44	-0.02
21	CR	-7.77	0.00	-0.04	3.18	3.21	-0.04	90	CR	-5.59	0.01	-0.02	1.77	1.78	-0.01
22	CR	-11.80	0.03	-0.06	2.91	2.97	-0.06	91	CR	-4.29	0.01	-0.03	2.22	2.25	-0.02
23	CR	-13.02	0.00	-0.06	2.08	2.14	-0.06	92	CR	6.12	0.03	-0.01	2.25	2.22	0.02
24	CR	-6.97	0.00	-0.04	2.25	2.29	-0.04	93	MC	6.75	0.02	-0.01	0.71	0.69	0.02
25	CR	-7.42	0.00	-0.03	2.45	2.48	-0.03	94	CR	-0.57	0.01	-0.04	2.20	2.20	-0.01
26	MC	-0.62	0.00	-0.01	0.79	0.80	0.00	95	MC	1.04	0.00	-0.01	0.89	0.89	0.00
27	MC	-3.03	0.01	-0.01	0.87	0.87	0.00	96	MC	1.38	0.00	0.00	0.94	0.94	0.00
28	MC	-0.19	0.02	-0.01	0.91	0.91	0.00	97	MC	-0.92	0.03	-0.01	0.36	0.38	0.00
29	MC	3.38	0.01	-0.01	0.90	0.89	0.01	98	MC	-7.22	0.02	-0.06	0.70	0.72	-0.02
30	MC	3.51	0.01	-0.01	0.71	0.70	0.01	99	MC	-0.57	0.01	0.00	0.91	0.91	0.00
31	MC	9.85	0.02	0.00	0.82	0.80	0.02	100	MC	0.15	0.01	-0.01	0.78	0.78	0.00
32	CR	4.25	0.05	-0.01	4.08	4.04	0.04	101	MC	1.97	0.01	0.00	0.59	0.59	0.00
33	MC	3.05	0.00	0.00	0.89	0.88	0.01	102	MC	-1.21	0.01	-0.01	0.76	0.77	0.00
34	MC	5.32	0.01	-0.01	0.83	0.82	0.01	103	MC	2.35	0.02	0.00	0.93	0.92	0.01
35	MC	6.36	0.01	0.00	0.93	0.92	0.01	104	MC	7.89	0.02	0.00	0.79	0.77	0.02

Appendix B-8. Differential Item Functioning Analysis, Grade 4, Reading, Female (N=19,838)

Item	Type	Z	D+	D-	O	P	D	Item	Type	Z	D+	D-	O	P	D
1	MC	0.78	0.01	0.00	0.94	0.93	0.00	36	MC	-7.24	0.00	-0.02	0.78	0.80	-0.02
2	MC	-6.84	0.00	-0.03	0.62	0.64	-0.02	37	CR	-2.69	0.02	-0.03	2.52	2.53	-0.01
3	MC	0.61	0.00	-0.01	0.91	0.91	0.00	38	MC	2.77	0.01	-0.01	0.74	0.74	0.00
4	MC	-1.57	0.01	-0.01	0.85	0.86	0.00	39	MC	3.97	0.01	0.00	0.82	0.81	0.01
5	MC	-1.02	0.02	-0.01	0.38	0.38	0.00	40	MC	1.82	0.01	-0.01	0.76	0.76	0.00
6	MC	3.16	0.01	-0.01	0.90	0.90	0.01	41	MC	0.66	0.01	-0.01	0.48	0.48	0.00
7	MC	3.29	0.01	0.00	0.94	0.94	0.01	42	MC	2.29	0.01	-0.03	0.79	0.79	0.00
8	MC	0.01	0.01	-0.01	0.91	0.91	0.00	43	MC	0.76	0.01	-0.01	0.67	0.67	0.00
9	MC	-1.77	0.01	-0.01	0.77	0.77	0.00	44	MC	3.20	0.01	0.00	0.78	0.78	0.01
10	MC	2.51	0.01	0.00	0.92	0.92	0.00	45	MC	0.07	0.00	0.00	0.95	0.95	0.00
11	CR	2.11	0.01	-0.01	2.46	2.45	0.01	46	MC	-2.99	0.01	-0.01	0.92	0.92	0.00
12	MC	3.59	0.01	0.00	0.87	0.86	0.01	47	MC	2.44	0.01	-0.01	0.84	0.83	0.00
13	MC	-3.46	0.00	-0.01	0.86	0.87	-0.01	48	MC	-10.86	0.01	-0.04	0.42	0.46	-0.04
14	CR	2.31	0.03	-0.02	2.06	2.05	0.01	49	MC	-10.72	0.02	-0.04	0.31	0.34	-0.03
15	MC	-4.26	0.00	-0.01	0.74	0.76	-0.01	50	MC	-1.86	0.00	-0.01	0.77	0.78	-0.01
16	MC	-1.64	0.02	-0.01	0.54	0.54	-0.01	51	MC	-6.08	0.00	-0.01	0.83	0.84	-0.01
17	CR	1.31	0.04	-0.04	2.00	1.99	0.01	52	MC	-1.18	0.01	-0.02	0.77	0.78	-0.01
18	MC	-4.11	0.01	-0.01	0.83	0.84	-0.01	87	CR	6.62	0.02	0.00	1.58	1.56	0.02
19	MC	-0.70	0.00	-0.01	0.73	0.74	0.00	88	MC	0.62	0.01	-0.01	0.75	0.75	0.00
20	CR	5.59	0.06	-0.03	1.97	1.93	0.03	89	CR	8.05	0.04	-0.01	4.59	4.56	0.04
21	CR	7.35	0.04	0.00	3.36	3.32	0.04	90	CR	4.06	0.02	0.00	1.82	1.81	0.01
22	CR	11.07	0.06	0.00	3.07	3.01	0.06	91	CR	1.94	0.03	-0.01	2.34	2.32	0.02
23	CR	9.87	0.06	-0.01	2.25	2.20	0.05	92	CR	-6.67	0.01	-0.04	2.27	2.30	-0.03
24	CR	6.17	0.04	-0.01	2.40	2.37	0.03	93	MC	-6.95	0.01	-0.03	0.70	0.72	-0.02
25	CR	6.78	0.03	0.00	2.57	2.54	0.03	94	CR	0.78	0.02	-0.03	2.28	2.28	0.00
26	MC	3.16	0.01	0.00	0.84	0.83	0.01	95	MC	1.80	0.01	0.00	0.91	0.91	0.00
27	MC	3.47	0.01	0.00	0.91	0.90	0.01	96	MC	0.88	0.00	0.00	0.96	0.95	0.00
28	MC	2.12	0.00	0.00	0.93	0.93	0.00	97	MC	-1.25	0.01	-0.02	0.40	0.40	0.00
29	MC	0.85	0.00	-0.01	0.91	0.92	0.00	98	MC	4.18	0.05	-0.04	0.78	0.74	0.02
30	MC	-4.17	0.01	-0.02	0.73	0.74	-0.01	99	MC	0.82	0.01	0.00	0.92	0.92	0.00
31	MC	-8.11	0.00	-0.02	0.80	0.83	-0.02	100	MC	-0.41	0.01	-0.01	0.80	0.80	0.00
32	CR	-3.62	0.02	-0.06	4.12	4.15	-0.04	101	MC	-3.33	0.01	-0.01	0.61	0.62	-0.01
33	MC	0.11	0.00	-0.01	0.91	0.91	0.00	102	MC	1.26	0.01	0.00	0.80	0.80	0.00
34	MC	-3.96	0.00	-0.01	0.84	0.85	-0.01	103	MC	-2.70	0.01	-0.01	0.93	0.94	0.00
35	MC	-4.44	0.00	-0.01	0.93	0.94	-0.01	104	MC	-5.39	0.01	-0.03	0.78	0.80	-0.02

Appendix B-7. Differential Item Functioning Analysis, Grade 4, Reading, African American (N=2,182)

Item	Type	Z	D+	D-	O	P	D	Item	Type	Z	D+	D-	O	P	D
1	MC	1.03	0.01	-0.01	0.84	0.83	0.01	36	MC	0.12	0.02	-0.01	0.67	0.66	0.00
2	MC	1.17	0.02	-0.04	0.53	0.52	0.01	37	CR	2.37	0.07	-0.02	2.34	2.31	0.04
3	MC	0.55	0.01	-0.01	0.82	0.81	0.00	38	MC	-0.83	0.02	-0.03	0.59	0.59	0.00
4	MC	-1.27	0.04	-0.03	0.73	0.74	-0.01	39	MC	-1.13	0.03	-0.02	0.66	0.67	-0.01
5	MC	-1.80	0.05	-0.04	0.27	0.29	-0.02	40	MC	-1.30	0.03	-0.03	0.62	0.63	-0.01
6	MC	-2.39	0.01	-0.03	0.77	0.79	-0.02	41	MC	-0.30	0.04	-0.03	0.38	0.38	0.00
7	MC	-0.81	0.01	-0.03	0.85	0.86	-0.01	42	MC	-2.30	0.02	-0.03	0.61	0.63	-0.02
8	MC	1.33	0.02	0.00	0.82	0.81	0.01	43	MC	1.11	0.04	-0.03	0.53	0.52	0.01
9	MC	-2.11	0.02	-0.03	0.60	0.63	-0.02	44	MC	-2.63	0.00	-0.03	0.82	0.84	-0.02
10	MC	-5.28	0.02	-0.04	0.81	0.84	-0.04	45	MC	2.56	0.02	-0.01	0.68	0.67	0.02
11	CR	1.46	0.04	-0.03	2.26	2.24	0.02	46	MC	1.64	0.03	-0.02	0.86	0.85	0.02
12	MC	-0.81	0.03	-0.02	0.75	0.75	0.00	47	MC	0.54	0.02	-0.01	0.71	0.70	0.00
13	MC	-0.37	0.02	-0.03	0.76	0.77	-0.01	48	MC	4.60	0.05	0.00	0.42	0.38	0.05
14	CR	-2.64	0.03	-0.06	1.82	1.85	-0.03	49	MC	0.84	0.05	-0.02	0.24	0.23	0.01
15	MC	-0.80	0.03	-0.04	0.65	0.65	-0.01	50	MC	1.22	0.02	-0.01	0.64	0.63	0.01
16	MC	8.63	0.09	0.00	0.50	0.41	0.09	51	MC	-0.36	0.02	-0.03	0.69	0.70	-0.01
17	CR	0.62	0.04	-0.05	1.85	1.85	0.01	52	MC	-4.39	0.01	-0.05	0.80	0.84	-0.04
18	MC	-2.94	0.00	-0.03	0.71	0.73	-0.03	87	CR	1.09	0.04	-0.03	1.46	1.45	0.01
19	MC	-0.29	0.02	-0.01	0.56	0.56	0.00	88	MC	0.38	0.04	-0.02	0.63	0.62	0.01
20	CR	-1.72	0.08	-0.08	1.70	1.72	-0.01	89	CR	4.99	0.13	0.00	4.19	4.07	0.120+
21	CR	-6.50	0.00	-0.10	2.75	2.85	-0.103*	90	CR	2.27	0.04	-0.01	1.68	1.66	0.02
22	CR	-1.08	0.05	-0.09	2.81	2.83	-0.02	91	CR	3.05	0.05	0.00	2.05	2.00	0.05
23	CR	-0.05	0.04	-0.06	1.95	1.95	0.00	92	CR	2.05	0.04	-0.03	2.00	1.97	0.03
24	CR	-0.04	0.04	-0.05	2.03	2.03	0.00	93	MC	-2.90	0.00	-0.04	0.57	0.60	-0.03
25	CR	-2.31	0.03	-0.06	2.24	2.27	-0.03	94	CR	0.80	0.05	-0.05	1.97	1.96	0.01
26	MC	-0.68	0.01	-0.03	0.67	0.68	-0.01	95	MC	-0.74	0.02	-0.01	0.81	0.81	0.00
27	MC	-1.17	0.01	-0.04	0.78	0.79	-0.01	96	MC	1.24	0.01	0.00	0.90	0.89	0.01
28	MC	-0.74	0.01	-0.02	0.83	0.84	-0.01	97	MC	2.17	0.05	-0.05	0.36	0.34	0.02
29	MC	-1.03	0.01	-0.02	0.81	0.82	-0.01	98	MC	1.97	0.06	-0.09	0.67	0.66	0.02
30	MC	2.87	0.04	-0.01	0.63	0.60	0.03	99	MC	-0.49	0.01	-0.01	0.86	0.86	0.00
31	MC	0.62	0.03	-0.03	0.71	0.71	0.00	100	MC	-0.81	0.03	-0.03	0.72	0.73	-0.01
32	CR	-1.35	0.02	-0.06	3.64	3.68	-0.04	101	MC	0.11	0.02	-0.04	0.48	0.48	0.00
33	MC	0.52	0.03	-0.03	0.81	0.80	0.01	102	MC	0.76	0.02	-0.02	0.67	0.66	0.01
34	MC	0.70	0.02	-0.02	0.74	0.74	0.01	103	MC	-0.24	0.02	-0.01	0.86	0.86	0.00
35	MC	0.10	0.01	0.00	0.85	0.84	0.01	104	MC	0.62	0.02	-0.02	0.67	0.66	0.01

Appendix B-8. Differential Item Functioning Analysis, Grade 4, Reading, Hispanic (N=8,847)

Item	Type	Z	D+	D-	O	P	D	Item	Type	Z	D+	D-	O	P	D
1	MC	3.26	0.02	0.00	0.86	0.85	0.02	36	MC	0.95	0.03	-0.01	0.68	0.67	0.01
2	MC	-2.65	0.01	-0.04	0.51	0.53	-0.02	37	CR	0.09	0.02	-0.01	2.32	2.32	0.00
3	MC	1.98	0.02	0.00	0.83	0.82	0.01	38	MC	0.02	0.02	-0.02	0.60	0.60	0.00
4	MC	-1.04	0.03	-0.01	0.75	0.75	0.00	39	MC	-0.16	0.01	-0.02	0.68	0.68	0.00
5	MC	-6.91	0.03	-0.05	0.25	0.29	-0.04	40	MC	-0.05	0.02	-0.02	0.64	0.64	0.00
6	MC	2.45	0.02	-0.01	0.81	0.80	0.01	41	MC	-0.88	0.01	-0.01	0.38	0.38	-0.01
7	MC	-0.36	0.02	-0.02	0.87	0.86	0.00	42	MC	-1.41	0.01	-0.02	0.63	0.64	-0.01
8	MC	0.07	0.01	-0.02	0.82	0.82	0.00	43	MC	-2.95	0.01	-0.03	0.51	0.53	-0.02
9	MC	-0.90	0.02	-0.01	0.63	0.64	-0.01	44	MC	0.06	0.02	-0.01	0.65	0.65	0.00
10	MC	-3.17	0.01	-0.04	0.83	0.85	-0.02	45	MC	1.01	0.01	0.00	0.88	0.88	0.00
11	CR	3.03	0.03	-0.04	2.28	2.25	0.02	46	MC	2.97	0.02	-0.01	0.86	0.85	0.01
12	MC	-2.52	0.03	-0.02	0.75	0.76	-0.01	47	MC	0.64	0.01	-0.01	0.72	0.71	0.00
13	MC	4.32	0.02	-0.01	0.80	0.77	0.02	48	MC	2.46	0.02	-0.03	0.39	0.38	0.02
14	CR	3.20	0.04	-0.03	1.88	1.86	0.02	49	MC	-3.16	0.06	-0.04	0.22	0.24	-0.02
15	MC	-0.20	0.02	-0.02	0.66	0.66	0.00	50	MC	-1.35	0.01	-0.02	0.63	0.64	-0.01
16	MC	-6.49	0.00	-0.04	0.38	0.42	-0.04	51	MC	2.41	0.02	-0.01	0.72	0.71	0.01
17	CR	-2.51	0.01	-0.05	1.84	1.86	-0.02	52	MC	-5.27	0.01	-0.05	0.62	0.65	-0.03
18	MC	1.05	0.02	-0.01	0.75	0.74	0.01	87	CR	0.58	0.03	-0.03	1.46	1.45	0.01
19	MC	-4.62	0.01	-0.03	0.54	0.57	-0.03	88	MC	-7.61	0.00	-0.05	0.58	0.63	-0.04
20	CR	-1.33	0.05	-0.06	1.72	1.73	0.00	89	CR	6.65	0.07	0.00	4.19	4.12	0.07
21	CR	-3.07	0.02	-0.04	2.86	2.89	-0.03	90	CR	3.65	0.05	-0.03	1.71	1.67	0.04
22	CR	5.92	0.08	-0.13	2.90	2.84	0.06	91	CR	2.42	0.05	-0.03	2.05	2.02	0.03
23	CR	1.69	0.05	-0.05	1.98	1.96	0.02	92	CR	-2.95	0.01	-0.04	1.96	1.99	-0.03
24	CR	-0.55	0.04	-0.03	2.04	2.05	-0.01	93	MC	0.49	0.02	-0.02	0.61	0.61	0.00
25	CR	0.97	0.03	-0.04	2.31	2.29	0.01	94	CR	4.20	0.04	0.00	2.01	1.98	0.04
26	MC	-1.04	0.00	-0.01	0.69	0.70	-0.01	95	MC	-0.51	0.01	-0.01	0.82	0.82	0.00
27	MC	1.30	0.02	-0.02	0.80	0.80	0.00	96	MC	0.80	0.01	0.00	0.90	0.90	0.01
28	MC	3.02	0.02	0.00	0.86	0.85	0.01	97	MC	-1.78	0.01	-0.02	0.33	0.34	-0.01
29	MC	0.34	0.01	-0.01	0.82	0.83	0.00	98	MC	1.74	0.05	-0.06	0.67	0.66	0.01
30	MC	-0.84	0.01	-0.02	0.60	0.61	-0.01	99	MC	0.99	0.01	-0.01	0.87	0.86	0.00
31	MC	-2.66	0.02	-0.02	0.70	0.72	-0.01	100	MC	2.29	0.02	-0.01	0.74	0.73	0.01
32	CR	-2.31	0.03	-0.05	3.68	3.72	-0.04	101	MC	-0.38	0.02	-0.03	0.48	0.49	0.00
33	MC	-0.48	0.01	-0.02	0.80	0.81	-0.01	102	MC	0.28	0.01	-0.03	0.67	0.67	0.00
34	MC	1.89	0.02	-0.01	0.75	0.74	0.01	103	MC	-1.28	0.01	-0.01	0.86	0.87	0.00
35	MC	-0.22	0.01	-0.01	0.66	0.65	0.00	104	MC	2.63	0.03	-0.01	0.69	0.67	0.01

Appendix B-9. Differential Item Functioning Analysis. Grade 4. Writing. Male (N=20,380)

Item	Type	Z	D+	D-	O	P	D	Item	Type	Z	D+	D-	O	P	D
1	CR	-1.25	0.00	0.00	1.99	1.99	0.00	65	MC	2.42	0.01	-0.01	0.83	0.83	0.00
1A	CR	-4.14	0.01	-0.02	1.46	1.47	-0.01	66	MC	5.02	0.01	-0.01	0.81	0.80	0.01
1B	CR	-4.63	0.00	-0.01	1.78	1.79	-0.01	67	CR	-13.26	0.00	-0.06	3.23	3.29	-0.07
1C	CR	4.33	0.03	-0.01	1.44	1.43	0.01	68	MC	1.32	0.01	-0.01	0.70	0.70	0.00
1D	CR	1.60	0.02	-0.01	1.84	1.84	0.00	69	MC	-2.21	0.00	-0.01	0.78	0.79	-0.01
1E	CR	-0.25	0.01	-0.02	1.82	1.82	0.00	70	MC	-0.53	0.00	0.00	0.80	0.80	0.00
1F	CR	0.85	0.01	-0.01	1.42	1.42	0.00	71	CR	-11.02	0.00	-0.05	3.08	3.13	-0.05
2A	CR	-9.77	0.07	-0.07	3.03	3.07	-0.04	72	MC	2.39	0.01	-0.01	0.87	0.87	0.01
2B	CR	-6.70	0.00	-0.03	3.03	3.06	-0.03	73	MC	8.72	0.02	-0.02	0.80	0.78	0.02
2C	CR	-5.23	0.01	-0.02	2.73	2.74	-0.02	74	MC	4.43	0.02	-0.01	0.85	0.83	0.01
53	MC	6.89	0.03	-0.02	0.83	0.81	0.02	75	MC	-4.37	0.02	-0.03	0.66	0.67	-0.01
54	MC	-9.41	0.01	-0.03	0.64	0.67	-0.03	76	MC	2.27	0.01	0.00	0.84	0.83	0.01
55	MC	4.04	0.03	-0.01	0.39	0.38	0.01	77	MC	13.07	0.04	0.00	0.63	0.59	0.04
56	MC	6.45	0.02	0.00	0.72	0.70	0.02	78	MC	2.91	0.01	-0.01	0.83	0.83	0.01
57	MC	4.37	0.01	0.00	0.93	0.92	0.01	79	MC	8.96	0.02	0.00	0.80	0.78	0.02
58	MC	4.47	0.03	-0.01	0.73	0.71	0.01	80	MC	1.88	0.01	-0.01	0.68	0.68	0.00
59	MC	8.35	0.02	0.00	0.90	0.88	0.02	81	MC	4.45	0.01	0.00	0.75	0.74	0.01
60	MC	6.36	0.01	0.00	0.92	0.91	0.01	82	MC	-1.97	0.01	-0.02	0.58	0.57	-0.01
61	MC	0.07	0.00	0.00	0.85	0.85	0.00	83	MC	-10.12	0.00	-0.04	0.45	0.48	-0.03
62	MC	3.15	0.01	0.00	0.90	0.89	0.01	84	MC	-5.39	0.00	-0.02	0.48	0.50	-0.02
63	MC	4.29	0.01	0.00	0.80	0.79	0.01	85	MC	0.02	0.01	-0.01	0.55	0.55	0.00
64	MC	3.61	0.01	0.00	0.83	0.82	0.01	86	CR	-11.52	0.06	-0.07	3.15	3.21	-0.06

Appendix B-10. Differential Item Functioning Analysis. Grade 4. Writing. Female (N=19,899)

Item	Type	Z	D+	D-	O	P	D	Item	Type	Z	D+	D-	O	P	D
1	CR	0.99	0.00	0.00	2.00	1.99	0.00	65	MC	-0.70	0.01	0.00	0.87	0.87	0.00
1A	CR	1.24	0.02	-0.01	1.54	1.54	0.01	66	MC	-2.71	0.01	-0.01	0.86	0.85	-0.01
1B	CR	6.21	0.02	0.00	1.86	1.84	0.02	67	CR	9.74	0.06	-0.03	3.50	3.45	0.05
1C	CR	-6.15	0.01	-0.03	1.49	1.51	-0.02	68	MC	-2.01	0.01	-0.01	0.74	0.75	-0.01
1D	CR	-1.85	0.02	-0.02	1.85	1.86	0.00	69	MC	2.61	0.01	0.00	0.83	0.82	0.01
1E	CR	4.42	0.01	-0.01	1.87	1.86	0.01	70	MC	1.69	0.01	0.00	0.93	0.92	0.01
1F	CR	-3.08	0.01	-0.02	1.47	1.48	-0.01	71	CR	6.42	0.04	-0.02	3.32	3.29	0.03
2A	CR	8.65	0.05	-0.01	3.21	3.17	0.04	72	MC	-1.82	0.01	-0.01	0.90	0.90	0.00
2B	CR	8.05	0.04	-0.02	3.18	3.16	0.02	73	MC	-7.40	0.00	-0.02	0.81	0.83	-0.02
2C	CR	9.32	0.02	0.00	2.83	2.80	0.02	74	MC	-3.92	0.01	-0.02	0.69	0.71	-0.02
53	MC	-9.13	0.00	-0.03	0.64	0.66	-0.03	75	MC	1.31	0.02	-0.02	0.72	0.71	0.01
54	MC	8.50	0.03	-0.02	0.74	0.71	0.03	76	MC	-0.21	0.01	-0.01	0.88	0.88	0.00
55	MC	-9.87	0.00	-0.03	0.43	0.46	-0.03	77	MC	-14.15	0.00	-0.05	0.61	0.66	-0.05
56	MC	-6.36	0.00	-0.02	0.74	0.76	-0.02	78	MC	-1.11	0.01	-0.01	0.87	0.87	0.00
57	MC	-2.45	0.00	-0.01	0.94	0.95	0.00	79	MC	-5.71	0.00	-0.01	0.82	0.83	-0.01
58	MC	-6.08	0.02	-0.02	0.75	0.76	-0.01	80	MC	-0.31	0.01	-0.01	0.74	0.75	0.00
59	MC	-3.48	0.00	-0.02	0.90	0.92	-0.01	81	MC	-4.18	0.00	-0.01	0.78	0.79	-0.01
60	MC	-3.10	0.00	-0.01	0.93	0.94	-0.01	82	MC	0.14	0.01	-0.01	0.64	0.64	0.00
61	MC	2.14	0.00	-0.01	0.89	0.88	0.00	83	MC	7.47	0.02	0.00	0.58	0.56	0.02
62	MC	0.13	0.00	0.00	0.92	0.92	0.00	84	MC	2.73	0.01	0.00	0.57	0.56	0.01
63	MC	-1.90	0.00	-0.01	0.84	0.84	-0.01	85	MC	-1.58	0.01	-0.01	0.61	0.61	-0.01
64	MC	0.03	0.00	-0.01	0.87	0.87	0.00	86	CR	8.04	0.06	0.00	3.43	3.39	0.04

Appendix B-11. Differential Item Functioning Analysis, Grade 4, Writing, African American (N=2,160)

Item	Type	Z	D+	D-	O	P	D	Item	Type	Z	D+	D-	O	P	D
1	CR	0.52	0.01	-0.01	1.99	1.99	0.00	65	MC	0.95	0.02	-0.03	0.78	0.76	0.01
1A	CR	0.52	0.03	-0.01	1.40	1.39	0.01	66	MC	0.70	0.02	-0.02	0.72	0.72	0.00
1B	CR	7.41	0.07	0.00	1.78	1.72	0.07	67	CR	5.35	0.08	0.00	3.19	3.11	0.08
1C	CR	1.78	0.02	-0.02	1.35	1.34	0.02	68	MC	0.84	0.05	-0.02	0.64	0.64	0.01
1D	CR	3.34	0.04	-0.02	1.84	1.82	0.03	69	MC	1.28	0.03	-0.02	0.75	0.74	0.01
1E	CR	2.07	0.03	-0.01	1.77	1.75	0.02	70	MC	3.22	0.03	-0.01	0.88	0.86	0.02
1F	CR	-1.33	0.02	-0.04	1.34	1.36	-0.01	71	CR	1.60	0.04	-0.04	2.97	2.95	0.03
2A	CR	1.78	0.07	-0.03	2.97	2.93	0.03	72	MC	-4.61	0.00	-0.03	0.78	0.81	-0.03
2B	CR	0.58	0.03	-0.03	2.95	2.95	0.00	73	MC	-1.70	0.01	-0.03	0.68	0.70	-0.02
2C	CR	7.18	0.07	0.00	2.72	2.65	0.07	74	MC	-2.09	0.03	-0.05	0.52	0.54	-0.02
53	MC	1.79	0.04	-0.02	0.56	0.54	0.02	75	MC	0.34	0.04	-0.03	0.62	0.61	0.00
54	MC	-4.55	0.03	-0.05	0.57	0.62	-0.05	76	MC	1.01	0.03	-0.02	0.76	0.75	0.01
55	MC	-1.30	0.02	-0.06	0.28	0.30	-0.02	77	MC	-2.99	0.01	-0.04	0.47	0.50	-0.03
56	MC	2.53	0.03	-0.01	0.64	0.62	0.02	78	MC	0.83	0.02	-0.01	0.76	0.75	0.01
57	MC	0.51	0.01	-0.01	0.69	0.68	0.00	79	MC	-1.83	0.04	-0.04	0.68	0.70	-0.01
58	MC	-1.61	0.02	-0.04	0.63	0.64	-0.02	80	MC	-5.42	0.01	-0.06	0.53	0.58	-0.05
59	MC	2.65	0.04	-0.01	0.85	0.82	0.03	81	MC	-2.58	0.02	-0.03	0.85	0.87	-0.02
60	MC	1.07	0.01	-0.04	0.87	0.87	0.00	82	MC	0.63	0.02	-0.01	0.48	0.48	0.01
61	MC	-1.35	0.01	-0.02	0.78	0.79	-0.01	83	MC	-3.15	0.02	-0.05	0.37	0.40	-0.03
62	MC	-5.85	0.00	-0.06	0.78	0.84	-0.06	84	MC	-3.66	0.01	-0.06	0.39	0.43	-0.04
63	MC	-0.93	0.02	-0.04	0.71	0.72	-0.01	85	MC	-1.21	0.01	-0.03	0.46	0.47	-0.01
64	MC	-2.51	0.00	-0.02	0.73	0.75	-0.02	86	CR	0.44	0.04	-0.03	3.01	3.00	0.01

Appendix B-12. Differential Item Functioning Analysis, Grade 4, Writing, Hispanic (N=5,868)

Item	Type	Z	D+	D-	O	P	D	Item	Type	Z	D+	D-	O	P	D
1	CR	0.24	0.00	0.00	1.99	1.99	0.00	65	MC	1.86	0.02	-0.01	0.77	0.76	0.01
1A	CR	4.26	0.03	-0.02	1.42	1.39	0.03	66	MC	4.82	0.03	-0.04	0.74	0.72	0.02
1B	CR	2.21	0.02	-0.10	1.73	1.72	0.01	67	CR	7.01	0.08	-0.06	3.19	3.12	0.07
1C	CR	1.18	0.02	-0.03	1.35	1.34	0.00	68	MC	1.43	0.03	-0.02	0.65	0.64	0.01
1D	CR	0.53	0.02	-0.02	1.82	1.82	0.00	69	MC	-0.32	0.01	-0.01	0.74	0.74	0.00
1E	CR	3.30	0.02	-0.01	1.77	1.76	0.01	70	MC	2.18	0.01	0.00	0.87	0.86	0.01
1F	CR	3.71	0.04	-0.01	1.38	1.36	0.02	71	CR	7.13	0.07	-0.03	3.02	2.96	0.06
2A	CR	5.07	0.06	-0.03	2.99	2.94	0.05	72	MC	-2.17	0.01	-0.03	0.80	0.82	-0.01
2B	CR	2.75	0.04	-0.04	2.97	2.96	0.02	73	MC	-5.20	0.00	-0.03	0.68	0.71	-0.03
2C	CR	6.18	0.03	0.00	2.69	2.66	0.04	74	MC	-7.59	0.00	-0.04	0.50	0.54	-0.04
53	MC	0.06	0.03	-0.02	0.54	0.55	0.00	75	MC	-0.54	0.02	-0.05	0.81	0.82	-0.01
54	MC	-2.99	0.01	-0.02	0.60	0.62	-0.02	76	MC	0.05	0.01	-0.01	0.75	0.75	0.00
55	MC	-4.44	0.02	-0.04	0.26	0.30	-0.03	77	MC	-10.49	0.00	-0.07	0.44	0.50	-0.06
56	MC	2.71	0.01	0.00	0.64	0.62	0.02	78	MC	-2.36	0.01	-0.02	0.74	0.76	-0.01
57	MC	-0.29	0.02	-0.01	0.69	0.69	0.00	79	MC	-5.17	0.01	-0.04	0.67	0.70	-0.03
58	MC	-4.21	0.02	-0.04	0.62	0.65	-0.03	80	MC	-1.91	0.00	-0.02	0.58	0.59	-0.01
59	MC	-13.57	0.00	-0.05	0.77	0.83	-0.05	81	MC	-1.86	0.01	-0.02	0.87	0.88	-0.01
60	MC	4.24	0.02	0.00	0.89	0.87	0.02	82	MC	0.82	0.02	-0.01	0.48	0.48	0.00
61	MC	-4.81	0.01	-0.04	0.76	0.79	-0.03	83	MC	-0.77	0.02	-0.01	0.40	0.40	0.00
62	MC	8.67	0.04	0.00	0.88	0.84	0.04	84	MC	-1.27	0.02	-0.03	0.42	0.43	-0.01
63	MC	5.31	0.03	-0.01	0.75	0.72	0.03	85	MC	-3.28	0.01	-0.03	0.46	0.48	-0.02
64	MC	-4.34	0.02	-0.03	0.73	0.75	-0.02	86	CR	4.33	0.06	-0.04	3.06	3.01	0.05

Appendix B-13. Differential Item Functioning Analysis, Grade 7, Reading, Male (N=17,175)

Item	Type	Z	D+	D-	Q	P	D	Item	Type	Z	D+	D-	Q	P	D
1	MC	4.78	0.02	0.00	0.70	0.68	0.02	41	CR	0.77	0.01	0.00	2.75	2.74	0.00
2	MC	4.83	0.01	0.00	0.93	0.90	0.01	42	MC	-1.81	0.00	-0.01	0.90	0.91	-0.01
3	MC	0.89	0.01	-0.02	0.78	0.77	0.00	43	MC	-1.43	0.01	-0.01	0.91	0.91	0.00
4	MC	2.86	0.01	0.00	0.94	0.94	0.01	44	MC	-1.97	0.01	-0.01	0.61	0.62	-0.01
5	CR	7.62	0.05	0.00	2.43	2.38	0.04	45	MC	-4.66	0.01	-0.02	0.25	0.27	-0.02
6	MC	0.34	0.01	0.00	0.95	0.94	0.00	46	CR	0.02	0.01	-0.01	1.70	1.70	0.00
7	MC	0.72	0.00	0.00	0.93	0.93	0.00	47	CR	-18.07	0.00	-0.07	1.79	1.86	-0.07
8	MC	8.79	0.03	0.00	0.70	0.68	0.03	48	CR	7.35	0.03	-0.01	1.52	1.50	0.02
9	MC	5.49	0.02	0.00	0.83	0.81	0.02	49	CR	1.39	0.06	-0.05	3.48	3.48	-0.01
10	MC	-9.50	0.00	-0.03	0.69	0.72	-0.03	50	MC	-3.53	0.00	-0.01	0.65	0.66	-0.01
11	MC	-2.96	0.00	-0.01	0.76	0.77	-0.01	51	MC	13.92	0.06	-0.01	0.37	0.32	0.05
12	MC	-7.34	0.00	-0.02	0.79	0.81	-0.02	52	MC	9.33	0.04	0.00	0.48	0.42	0.03
13	MC	4.70	0.02	0.00	0.64	0.63	0.02	98	MC	-7.79	0.00	-0.03	0.53	0.56	-0.03
14	MC	-4.60	0.02	-0.03	0.60	0.62	-0.02	99	MC	-3.57	0.01	-0.02	0.83	0.84	-0.01
15	MC	-5.56	0.01	-0.02	0.45	0.47	-0.02	100	MC	-5.95	0.01	-0.02	0.70	0.72	-0.02
16	MC	-5.39	0.00	-0.02	0.76	0.78	-0.02	101	MC	-6.02	0.01	-0.02	0.83	0.85	-0.02
17	MC	10.21	0.04	0.00	0.59	0.55	0.04	102	MC	-5.59	0.01	-0.02	0.91	0.92	-0.01
18	CR	-8.32	0.00	-0.06	1.97	2.03	-0.06	103	MC	-0.03	0.01	-0.02	0.78	0.79	0.00
19	CR	-10.58	0.00	-0.08	2.32	2.39	-0.08	104	MC	1.33	0.01	0.00	0.89	0.89	0.00
20	MC	10.33	0.03	0.00	0.88	0.85	0.03	105	MC	2.36	0.01	-0.01	0.93	0.93	0.01
21	MC	9.93	0.03	0.00	0.89	0.86	0.03	106	MC	1.41	0.00	0.00	0.94	0.93	0.00
22	MC	0.20	0.01	-0.01	0.90	0.90	0.00	107	MC	1.86	0.01	0.00	0.81	0.80	0.01
23	MC	1.93	0.01	-0.01	0.84	0.83	0.00	108	MC	5.53	0.02	-0.01	0.72	0.71	0.02
24	MC	-3.69	0.00	-0.02	0.58	0.60	-0.01	109	MC	2.97	0.02	-0.01	0.88	0.86	0.01
25	MC	1.46	0.01	0.00	0.87	0.86	0.00	110	MC	-0.14	0.01	-0.01	0.84	0.84	0.00
26	MC	-0.90	0.01	-0.01	0.65	0.65	0.00	111	MC	6.04	0.03	-0.01	0.49	0.47	0.02
28	MC	0.83	0.02	-0.01	0.72	0.72	0.00	112	MC	3.25	0.01	-0.01	0.70	0.69	0.01
29	MC	2.48	0.02	-0.01	0.56	0.55	0.01	113	MC	1.94	0.01	-0.01	0.84	0.83	0.01
30	MC	4.88	0.01	0.00	0.76	0.75	0.01	114	MC	-2.08	0.01	-0.02	0.49	0.50	-0.01
31	MC	3.18	0.02	-0.01	0.88	0.87	0.01	115	MC	0.81	0.01	-0.01	0.36	0.36	0.00
32	MC	4.31	0.01	0.00	0.87	0.86	0.01	116	MC	0.39	0.01	0.00	0.68	0.68	0.00
33	MC	-0.49	0.00	0.00	0.95	0.95	0.00	117	MC	5.59	0.02	0.00	0.57	0.55	0.02
34	MC	1.19	0.01	-0.01	0.68	0.68	0.00	118	MC	-4.70	0.01	-0.03	0.79	0.80	-0.01
35	MC	12.92	0.04	0.00	0.80	0.78	0.04	119	MC	5.14	0.01	0.00	0.61	0.59	0.02
36	CR	1.53	0.03	-0.02	3.43	3.43	0.01	120	CR	-2.42	0.01	-0.03	3.26	3.28	-0.02
37	CR	2.32	0.02	-0.02	3.16	3.14	0.01	121	CR	-8.72	0.00	-0.04	1.97	2.01	-0.04
38	CR	7.18	0.07	-0.04	2.59	2.56	0.04	122	CR	-18.44	0.00	-0.12	1.81	1.93	-0.117*
39	CR	-5.00	0.01	-0.04	1.72	1.74	-0.02	123	CR	-12.30	0.00	-0.08	2.55	2.63	-0.08
40	CR	3.87	0.07	-0.05	3.08	3.04	0.04								

Appendix B-14. Differential Item Functioning Analysis, Grade 7, Reading, Female (N=18,601)

Item	Type	Z	D+	D-	O	P	D	Item	Type	Z	D+	D-	O	P	D
1	MC	-5.04	0.00	-0.02	0.71	0.73	-0.02	41	CR	2.29	0.01	-0.01	2.81	2.81	0.01
2	MC	-2.86	0.00	-0.01	0.94	0.94	0.00	42	MC	5.36	0.01	0.00	0.94	0.93	0.01
3	MC	-0.99	0.01	-0.01	0.79	0.79	0.00	43	MC	1.29	0.01	0.00	0.94	0.93	0.01
4	MC	-1.30	0.00	0.00	0.95	0.95	0.00	44	MC	1.28	0.01	-0.01	0.67	0.67	0.00
5	CR	-6.82	0.01	-0.05	2.43	2.47	-0.04	45	MC	3.05	0.02	-0.01	0.30	0.29	0.01
6	MC	0.53	0.00	0.00	0.96	0.96	0.00	46	CR	0.55	0.01	-0.01	1.75	1.75	0.00
7	MC	0.94	0.00	0.00	0.95	0.95	0.00	47	CR	10.24	0.09	-0.01	2.05	1.99	0.06
8	MC	-9.81	0.00	-0.04	0.69	0.72	-0.03	48	CR	-6.75	0.00	-0.03	1.54	1.57	-0.03
9	MC	-4.98	0.00	-0.01	0.82	0.84	-0.01	49	CR	3.25	0.06	-0.05	3.72	3.71	0.01
10	MC	9.55	0.04	-0.01	0.79	0.76	0.03	50	MC	3.55	0.01	0.00	0.72	0.71	0.01
11	MC	3.56	0.01	0.00	0.82	0.81	0.01	51	MC	-16.82	0.00	-0.06	0.30	0.36	-0.06
12	MC	8.31	0.02	0.00	0.88	0.84	0.02	52	MC	-11.52	0.01	-0.05	0.43	0.47	-0.04
13	MC	-5.94	0.00	-0.02	0.65	0.67	-0.02	98	MC	6.76	0.02	0.00	0.62	0.60	0.02
14	MC	3.81	0.02	-0.01	0.67	0.66	0.01	99	MC	5.73	0.02	0.00	0.88	0.87	0.01
15	MC	4.16	0.02	-0.01	0.52	0.50	0.02	100	MC	7.19	0.02	0.00	0.79	0.77	0.02
16	MC	5.83	0.02	0.00	0.84	0.82	0.02	101	MC	7.86	0.02	0.00	0.90	0.88	0.02
17	MC	-11.39	0.01	-0.05	0.54	0.59	-0.04	102	MC	4.46	0.02	0.00	0.95	0.94	0.01
18	CR	4.06	0.05	-0.03	2.23	2.20	0.04	103	MC	1.73	0.01	-0.01	0.83	0.83	0.00
19	CR	8.80	0.07	0.00	2.60	2.53	0.07	104	MC	0.72	0.01	0.00	0.92	0.92	0.00
20	MC	-8.48	0.00	-0.02	0.86	0.89	-0.02	105	MC	-2.11	0.00	-0.01	0.94	0.94	0.00
21	MC	-7.13	0.00	-0.04	0.87	0.90	-0.02	106	MC	1.75	0.01	0.00	0.96	0.96	0.00
22	MC	0.21	0.01	0.00	0.92	0.92	0.00	107	MC	-1.77	0.01	-0.02	0.84	0.85	0.00
23	MC	0.31	0.01	-0.01	0.87	0.87	0.00	108	MC	-5.36	0.00	-0.02	0.74	0.75	-0.02
24	MC	3.49	0.02	0.00	0.67	0.65	0.01	109	MC	-2.29	0.00	-0.01	0.87	0.88	-0.01
25	MC	-0.15	0.00	-0.01	0.89	0.89	0.00	110	MC	2.08	0.01	0.00	0.87	0.87	0.00
26	MC	1.06	0.02	-0.01	0.69	0.68	0.00	111	MC	-8.29	0.00	-0.03	0.49	0.51	-0.03
28	MC	-1.15	0.01	-0.02	0.75	0.75	0.00	112	MC	-3.68	0.01	-0.01	0.74	0.75	-0.01
29	MC	-3.99	0.04	-0.02	0.59	0.61	-0.01	113	MC	-1.25	0.01	-0.01	0.86	0.86	0.00
30	MC	-3.48	0.00	-0.02	0.79	0.80	-0.01	114	MC	1.38	0.01	-0.01	0.54	0.53	0.01
31	MC	-4.03	0.01	-0.01	0.88	0.89	-0.01	115	MC	-3.44	0.01	-0.02	0.40	0.41	-0.01
32	MC	-2.94	0.00	-0.01	0.88	0.88	-0.01	116	MC	-0.16	0.01	-0.01	0.73	0.73	0.00
33	MC	2.89	0.01	0.00	0.97	0.96	0.01	117	MC	-7.03	0.01	-0.04	0.58	0.61	-0.03
34	MC	-0.94	0.00	-0.01	0.72	0.73	0.00	118	MC	2.97	0.03	-0.01	0.86	0.85	0.01
35	MC	-12.90	0.00	-0.04	0.76	0.79	-0.04	119	MC	-5.39	0.00	-0.03	0.83	0.85	-0.02
36	CR	3.52	0.03	-0.03	3.55	3.54	0.01	120	CR	1.49	0.02	-0.01	3.47	3.46	0.01
37	CR	-1.81	0.01	-0.02	3.25	3.27	-0.01	121	CR	7.28	0.03	0.00	2.14	2.10	0.04
38	CR	-8.78	0.04	-0.05	2.57	2.61	-0.03	122	CR	13.83	0.12	-0.03	2.16	2.07	0.09
39	CR	3.51	0.02	-0.03	1.81	1.80	0.01	123	CR	11.15	0.07	0.00	2.82	2.75	0.07
40	CR	-6.85	0.03	-0.06	3.14	3.16	-0.04								

Appendix B-15. Differential Item Functioning Analysis, Grade 7, Reading, African American (N=1,882)

Item	Type	Z	D+	D-	O	P	D	Item	Type	Z	D+	D-	O	P	D
1	MC	-1.93	0.01	-0.03	0.60	0.61	-0.02	41	CR	3.81	0.05	-0.01	2.66	2.61	0.05
2	MC	1.16	0.02	-0.01	0.90	0.89	0.01	42	MC	-0.85	0.02	-0.02	0.86	0.86	-0.01
3	MC	-1.19	0.03	-0.04	0.72	0.73	-0.01	43	MC	1.98	0.03	-0.02	0.88	0.86	0.02
4	MC	-2.73	0.00	-0.03	0.88	0.90	-0.02	44	MC	-2.52	0.01	-0.05	0.50	0.53	-0.03
5	CR	-7.23	0.00	-0.12	2.09	2.21	-0.123	45	MC	2.33	0.04	-0.01	0.28	0.24	0.02
6	MC	-0.84	0.01	-0.01	0.91	0.91	-0.01	46	CR	0.25	0.02	-0.02	1.61	1.61	0.00
7	MC	-2.42	0.01	-0.02	0.87	0.89	-0.02	47	CR	-0.46	0.07	-0.04	1.83	1.82	0.01
8	MC	-4.87	0.02	-0.06	0.54	0.59	-0.05	48	CR	-1.23	0.02	-0.02	1.37	1.38	-0.01
9	MC	0.30	0.04	-0.02	0.78	0.78	0.00	49	CR	-0.97	0.06	-0.06	2.98	3.02	-0.04
10	MC	1.82	0.03	-0.02	0.65	0.63	0.02	50	MC	1.45	0.03	-0.07	0.57	0.56	0.01
11	MC	-2.32	0.03	-0.05	0.68	0.70	-0.02	51	MC	-0.83	0.02	-0.03	0.28	0.28	-0.01
12	MC	0.19	0.06	-0.02	0.75	0.75	0.00	52	MC	-1.31	0.02	-0.05	0.33	0.35	-0.02
13	MC	-2.39	0.03	-0.06	0.53	0.56	-0.03	98	MC	-3.40	0.03	-0.05	0.46	0.49	-0.04
14	MC	3.44	0.05	-0.03	0.58	0.55	0.04	99	MC	1.48	0.03	-0.01	0.78	0.77	0.01
15	MC	-1.76	0.03	-0.04	0.38	0.40	-0.02	100	MC	-2.69	0.01	-0.04	0.59	0.62	-0.03
16	MC	-0.12	0.01	-0.01	0.70	0.70	0.00	101	MC	3.87	0.03	0.00	0.82	0.79	0.03
17	MC	-7.07	0.00	-0.09	0.40	0.48	-0.08	102	MC	-0.77	0.01	-0.02	0.88	0.89	-0.01
18	CR	2.26	0.06	-0.03	1.80	1.74	0.06	103	MC	3.57	0.04	0.00	0.74	0.70	0.03
19	CR	0.80	0.06	-0.03	2.16	2.14	0.02	104	MC	2.54	0.02	-0.01	0.86	0.84	0.02
20	MC	-0.18	0.02	-0.02	0.78	0.79	0.00	105	MC	-7.74	0.00	-0.05	0.85	0.90	-0.05
21	MC	1.01	0.02	-0.03	0.80	0.79	0.01	106	MC	0.35	0.02	-0.01	0.90	0.89	0.01
22	MC	-1.05	0.01	-0.02	0.86	0.86	-0.01	107	MC	1.20	0.05	-0.02	0.73	0.71	0.01
23	MC	4.33	0.04	0.00	0.80	0.76	0.04	108	MC	2.43	0.03	-0.01	0.65	0.62	0.03
24	MC	0.62	0.02	-0.01	0.50	0.49	0.01	109	MC	-1.14	0.02	-0.03	0.79	0.80	-0.01
25	MC	3.02	0.03	-0.01	0.82	0.80	0.03	110	MC	0.88	0.02	-0.02	0.78	0.77	0.01
26	MC	2.85	0.04	-0.02	0.62	0.59	0.03	111	MC	2.20	0.04	-0.01	0.41	0.38	0.02
28	MC	-1.80	0.02	-0.03	0.63	0.65	-0.02	112	MC	-0.88	0.02	-0.03	0.58	0.59	-0.01
29	MC	1.93	0.04	-0.01	0.46	0.44	0.02	113	MC	-2.66	0.02	-0.04	0.74	0.77	-0.02
30	MC	2.42	0.03	-0.02	0.67	0.65	0.03	114	MC	1.83	0.03	-0.03	0.47	0.45	0.02
31	MC	4.18	0.05	-0.02	0.86	0.83	0.03	115	MC	-0.67	0.02	-0.03	0.28	0.29	-0.01
32	MC	3.22	0.03	0.00	0.83	0.80	0.03	116	MC	-0.81	0.03	-0.03	0.58	0.59	-0.01
33	MC	-1.39	0.01	-0.01	0.92	0.91	0.00	117	MC	0.28	0.01	-0.02	0.46	0.46	0.00
34	MC	-5.95	0.00	-0.06	0.53	0.59	-0.06	118	MC	3.89	0.06	-0.05	0.78	0.74	0.04
35	MC	-2.52	0.00	-0.03	0.66	0.69	-0.03	119	MC	1.21	0.04	-0.02	0.49	0.48	0.01
36	CR	-3.58	0.08	-0.12	3.13	3.19	-0.06	120	CR	10.61	0.29	0.00	3.24	2.95	0.293+
37	CR	-7.30	0.00	-0.13	2.77	2.90	-0.127	121	CR	3.61	0.07	-0.09	1.90	1.85	0.05
38	CR	0.79	0.06	-0.11	2.47	2.46	0.01	122	CR	-0.02	0.08	-0.06	1.74	1.72	0.02
39	CR	-1.59	0.02	-0.04	1.61	1.63	-0.02	123	CR	2.40	0.06	-0.02	2.44	2.40	0.04
40	CR	-3.67	0.01	-0.09	2.69	2.77	-0.08								

Appendix B-16. Differential Item Functioning Analysis, Grade 7, Reading, Hispanic (N=5,380)

Item	Type	Z	D+	D-	O	P	D	Item	Type	Z	D+	D-	O	P	D
1	MC	0.35	0.01	-0.01	0.60	0.60	0.00	41	CR	4.52	0.04	0.00	2.61	2.57	0.04
2	MC	3.71	0.03	-0.01	0.90	0.88	0.02	42	MC	-2.23	0.05	-0.02	0.86	0.86	0.00
3	MC	1.36	0.02	-0.02	0.73	0.72	0.01	43	MC	-0.10	0.02	-0.02	0.85	0.85	0.00
4	MC	1.56	0.02	-0.01	0.90	0.89	0.01	44	MC	-1.00	0.01	-0.02	0.50	0.51	-0.01
5	CR	1.64	0.02	-0.01	2.18	2.17	0.02	45	MC	-1.30	0.02	-0.01	0.22	0.23	-0.01
6	MC	1.21	0.01	-0.01	0.91	0.91	0.01	46	CR	3.96	0.02	0.00	1.60	1.58	0.02
7	MC	2.34	0.02	0.00	0.89	0.88	0.01	47	CR	0.15	0.06	-0.03	1.59	1.57	0.02
8	MC	-1.36	0.01	-0.02	0.57	0.56	-0.01	48	CR	-5.78	0.01	-0.06	1.31	1.35	-0.04
9	MC	-1.58	0.01	-0.02	0.73	0.74	-0.01	49	CR	4.45	0.10	-0.05	2.97	2.91	0.06
10	MC	2.84	0.03	-0.01	0.63	0.61	0.02	50	MC	-0.94	0.02	-0.02	0.53	0.54	-0.01
11	MC	1.23	0.02	-0.01	0.69	0.68	0.01	51	MC	-4.16	0.03	-0.03	0.23	0.25	-0.02
12	MC	3.95	0.03	0.00	0.76	0.73	0.02	52	MC	-3.03	0.01	-0.03	0.31	0.33	-0.02
13	MC	0.12	0.04	-0.01	0.54	0.54	0.00	98	MC	-3.24	0.02	-0.03	0.46	0.48	-0.02
14	MC	4.44	0.04	-0.01	0.56	0.53	0.03	99	MC	6.37	0.06	0.00	0.79	0.75	0.04
15	MC	0.39	0.01	-0.01	0.39	0.39	0.00	100	MC	4.34	0.02	0.00	0.63	0.60	0.02
16	MC	3.72	0.03	0.00	0.71	0.69	0.02	101	MC	6.18	0.04	0.00	0.81	0.77	0.03
17	MC	-4.33	0.00	-0.03	0.44	0.47	-0.03	102	MC	5.21	0.03	0.00	0.90	0.88	0.02
18	CR	0.21	0.06	-0.03	1.70	1.68	0.02	103	MC	4.31	0.03	0.00	0.71	0.68	0.03
19	CR	0.39	0.05	-0.04	2.10	2.09	0.01	104	MC	1.43	0.01	-0.01	0.83	0.82	0.01
20	MC	-7.71	0.00	-0.05	0.73	0.77	-0.04	105	MC	0.76	0.02	-0.01	0.90	0.89	0.01
21	MC	-4.86	0.01	-0.03	0.75	0.77	-0.03	106	MC	-0.34	0.01	-0.01	0.88	0.88	0.00
22	MC	-1.24	0.01	-0.02	0.85	0.85	-0.01	107	MC	-10.99	0.00	-0.06	0.63	0.69	-0.06
23	MC	-0.38	0.01	-0.01	0.74	0.74	0.00	108	MC	2.53	0.02	-0.02	0.62	0.60	0.02
24	MC	-0.63	0.01	-0.02	0.47	0.47	-0.01	109	MC	-1.58	0.01	-0.02	0.78	0.79	-0.01
25	MC	-0.38	0.02	-0.01	0.78	0.78	0.00	110	MC	-0.25	0.01	-0.01	0.75	0.76	0.00
26	MC	4.20	0.04	-0.01	0.61	0.58	0.03	111	MC	-2.45	0.05	-0.02	0.35	0.37	-0.02
28	MC	-1.77	0.03	-0.03	0.62	0.63	-0.01	112	MC	-4.63	0.00	-0.04	0.54	0.57	-0.03
29	MC	-0.34	0.04	-0.02	0.42	0.42	0.00	113	MC	-0.44	0.02	-0.02	0.74	0.75	-0.01
30	MC	-0.04	0.01	-0.02	0.62	0.62	0.00	114	MC	0.22	0.02	-0.01	0.44	0.43	0.00
31	MC	2.51	0.03	-0.03	0.83	0.82	0.01	115	MC	-1.81	0.02	-0.02	0.28	0.27	-0.01
32	MC	-2.54	0.01	-0.03	0.77	0.78	-0.02	116	MC	-0.35	0.02	-0.02	0.56	0.57	0.00
33	MC	0.73	0.01	0.00	0.91	0.90	0.00	117	MC	-1.93	0.01	-0.02	0.43	0.44	-0.01
34	MC	-5.89	0.01	-0.05	0.54	0.57	-0.04	118	MC	-2.19	0.03	-0.04	0.71	0.73	-0.01
35	MC	-1.01	0.01	-0.02	0.66	0.67	-0.01	119	MC	-6.75	0.01	-0.06	0.41	0.45	-0.04
36	CR	1.55	0.07	-0.04	3.15	3.13	0.01	120	CR	6.26	0.10	0.00	2.98	2.87	0.103+
37	CR	-6.29	0.00	-0.07	2.77	2.84	-0.07	121	CR	1.96	0.04	-0.02	1.83	1.81	0.02
38	CR	0.53	0.05	-0.12	2.44	2.44	0.00	122	CR	3.92	0.08	-0.04	1.72	1.67	0.05
39	CR	5.37	0.06	-0.01	1.84	1.80	0.04	123	CR	2.81	0.05	-0.03	2.38	2.35	0.03
40	CR	-4.60	0.06	-0.09	2.65	2.70	-0.06								

Appendix B-17. Differential Item Functioning Analysis. Grade 7. Writing. Male (N=16,843)

Item	Type	Z	D+	D-	O	P	D	Item	Type	Z	D+	D-	O	P	D
1	CR	-1.75	0.00	0.00	1.98	1.99	0.00	69	MC	1.18	0.01	-0.01	0.77	0.78	0.01
1A	CR	-7.98	0.01	-0.04	1.65	1.67	-0.03	70	MC	3.36	0.01	0.00	0.79	0.78	0.01
1B	CR	5.23	0.02	0.00	1.85	1.83	0.01	71	CR	-11.54	0.14	-0.06	3.39	3.45	-0.06
1C	CR	1.32	0.01	0.00	1.94	1.94	0.01	72	MC	-16.12	0.00	-0.06	0.55	0.61	-0.06
1D	CR	-0.17	0.00	0.00	1.98	1.98	0.00	73	MC	-5.50	0.00	-0.02	0.54	0.56	-0.02
1E	CR	1.27	0.01	-0.01	1.90	1.90	0.01	74	MC	-3.23	0.01	-0.02	0.34	0.36	-0.01
1F	CR	3.80	0.02	0.00	1.84	1.83	0.01	75	MC	-2.59	0.01	-0.02	0.50	0.50	-0.01
2A	CR	-13.15	0.01	-0.09	3.38	3.46	-0.08	76	MC	-3.87	0.00	-0.02	0.70	0.71	-0.01
2B	CR	-14.37	0.00	-0.07	3.47	3.54	-0.07	77	MC	-6.38	0.00	-0.01	0.85	0.86	-0.02
2C	CR	-8.38	0.00	-0.02	2.66	2.69	-0.02	78	MC	-6.00	0.00	-0.02	0.75	0.76	-0.02
27	CR	-14.80	0.09	-0.10	3.19	3.27	-0.08	79	MC	-6.12	0.01	-0.02	0.56	0.58	-0.02
53	MC	-0.13	0.01	-0.01	0.84	0.84	0.00	80	MC	-0.70	0.02	-0.01	0.80	0.80	0.00
54	MC	-2.86	0.01	-0.02	0.43	0.44	-0.01	81	MC	-4.18	0.01	-0.02	0.61	0.63	-0.02
55	MC	-0.27	0.02	-0.01	0.59	0.59	0.00	82	MC	-4.17	0.00	-0.01	0.95	0.96	-0.01
56	MC	0.17	0.01	-0.01	0.43	0.43	0.00	83	MC	-6.59	0.00	-0.02	0.87	0.89	-0.02
57	MC	4.11	0.02	-0.01	0.45	0.43	0.02	84	MC	-4.68	0.02	-0.03	0.72	0.73	-0.01
58	MC	8.33	0.03	0.00	0.59	0.56	0.03	85	MC	3.19	0.01	0.00	0.82	0.81	0.01
59A	CR	-5.57	0.01	-0.02	1.68	1.69	-0.02	86	MC	3.24	0.02	-0.01	0.51	0.50	0.01
59B	CR	1.56	0.01	0.00	1.03	1.03	0.00	87	MC	2.54	0.02	0.00	0.66	0.66	0.01
59C	CR	-2.09	0.02	-0.02	1.50	1.51	-0.01	88	MC	14.28	0.05	-0.01	0.69	0.64	0.05
59D	CR	-1.07	0.02	-0.01	1.81	1.82	0.00	89	MC	23.76	0.08	0.00	0.52	0.43	0.08
60	MC	1.84	0.01	-0.01	0.95	0.95	0.00	90	MC	13.72	0.04	-0.01	0.81	0.77	0.04
61	MC	5.95	0.02	-0.01	0.74	0.72	0.02	91	MC	8.89	0.03	-0.02	0.78	0.76	0.02
62	MC	-0.57	0.01	-0.02	0.76	0.76	0.00	92	MC	10.55	0.03	0.00	0.89	0.87	0.02
63	MC	-1.57	0.01	-0.01	0.84	0.84	0.00	93	MC	12.68	0.04	0.00	0.69	0.65	0.04
64	MC	-2.26	0.01	-0.02	0.51	0.52	-0.01	94	MC	12.37	0.04	0.00	0.52	0.47	0.04
65	MC	4.25	0.02	0.00	0.63	0.62	0.01	95	MC	8.71	0.04	0.00	0.31	0.28	0.03
66	MC	4.41	0.02	-0.01	0.49	0.47	0.02	96	MC	1.71	0.02	-0.02	0.51	0.50	0.01
67	MC	6.83	0.02	0.00	0.70	0.68	0.02	97	CR	-13.62	0.01	-0.09	3.44	3.51	-0.07
68	MC	3.05	0.01	0.00	0.89	0.88	0.01								

Appendix B-18. Differential Item Functioning Analysis, Grade 7, Writing, Female (N=18,384)

Item	Type	Z	D+	D-	O	P	D	Item	Type	Z	D+	D-	O	P	D
1	CR	1.81	0.00	0.00	1.99	1.99	0.00	69	MC	-1.08	0.01	-0.01	0.80	0.81	0.00
1A	CR	9.41	0.03	0.00	1.76	1.73	0.03	70	MC	-1.83	0.01	-0.02	0.81	0.82	-0.01
1B	CR	-1.92	0.00	-0.02	1.87	1.87	-0.01	71	CR	11.02	0.06	0.00	3.67	3.61	0.06
1C	CR	0.14	0.00	-0.01	1.96	1.96	0.00	72	MC	16.05	0.05	0.00	0.72	0.67	0.05
1D	CR	0.27	0.00	0.00	1.98	1.98	0.00	73	MC	4.42	0.02	-0.02	0.63	0.61	0.02
1E	CR	-1.47	0.01	-0.01	1.92	1.92	0.00	74	MC	1.28	0.01	-0.01	0.40	0.39	0.01
1F	CR	-1.92	0.01	-0.02	1.86	1.86	-0.01	75	MC	0.54	0.01	-0.01	0.57	0.57	0.00
2A	CR	12.66	0.07	0.00	3.69	3.62	0.07	76	MC	5.68	0.02	0.00	0.79	0.77	0.02
2B	CR	12.77	0.06	0.00	3.75	3.69	0.06	77	MC	7.20	0.03	0.00	0.91	0.89	0.02
2C	CR	8.91	0.03	0.00	2.78	2.75	0.03	78	MC	6.23	0.03	0.00	0.83	0.81	0.02
27	CR	13.52	0.08	0.00	3.50	3.42	0.08	79	MC	5.46	0.02	0.00	0.65	0.63	0.02
53	MC	2.12	0.01	-0.01	0.88	0.87	0.00	80	MC	0.10	0.01	-0.01	0.85	0.84	0.00
54	MC	-0.65	0.01	-0.01	0.48	0.49	0.00	81	MC	2.52	0.01	-0.01	0.67	0.66	0.01
55	MC	-1.14	0.01	-0.02	0.83	0.84	-0.01	82	MC	5.59	0.01	0.00	0.98	0.97	0.01
56	MC	-2.49	0.01	-0.02	0.48	0.49	-0.01	83	MC	6.95	0.02	0.00	0.94	0.91	0.02
57	MC	-7.65	0.00	-0.03	0.45	0.48	-0.03	84	MC	2.85	0.04	-0.01	0.78	0.77	0.01
58	MC	-9.73	0.00	-0.04	0.58	0.62	-0.04	85	MC	0.50	0.01	-0.01	0.86	0.86	0.00
59A	CR	6.34	0.02	-0.01	1.77	1.75	0.02	86	MC	-5.80	0.01	-0.02	0.54	0.56	-0.02
59B	CR	-3.99	0.00	-0.01	1.03	1.04	-0.01	87	MC	-2.94	0.01	-0.02	0.71	0.72	-0.01
59C	CR	1.93	0.01	-0.01	1.57	1.57	0.01	88	MC	-14.37	0.00	-0.05	0.66	0.71	-0.05
59D	CR	0.24	0.02	-0.01	1.85	1.85	0.01	89	MC	-27.36	0.00	-0.10	0.40	0.50	-0.10
60	MC	0.56	0.00	-0.01	0.96	0.96	0.00	90	MC	-12.41	0.00	-0.03	0.79	0.82	-0.03
61	MC	-6.15	0.00	-0.02	0.75	0.77	-0.02	91	MC	-8.05	0.00	-0.02	0.78	0.80	-0.02
62	MC	-0.76	0.02	-0.02	0.83	0.83	0.00	92	MC	-6.96	0.00	-0.02	0.89	0.91	-0.02
63	MC	0.88	0.02	-0.01	0.88	0.87	0.00	93	MC	-12.94	0.00	-0.04	0.66	0.71	-0.04
64	MC	-0.61	0.02	-0.01	0.55	0.56	0.00	94	MC	-15.34	0.00	-0.05	0.49	0.54	-0.05
65	MC	-2.84	0.00	-0.01	0.85	0.86	-0.01	95	MC	-13.83	0.02	-0.05	0.28	0.33	-0.05
66	MC	-6.93	0.01	-0.03	0.50	0.53	-0.03	96	MC	-4.64	0.01	-0.03	0.53	0.54	-0.02
67	MC	-6.49	0.01	-0.03	0.71	0.73	-0.02	97	CR	12.51	0.07	0.00	3.70	3.64	0.07
68	MC	-0.16	0.01	-0.01	0.91	0.91	0.00								

Appendix B-19. Differential Item Functioning Analysis, Grade 7, Writing, African American (N=1,832)

Item	Type	Z	D+	D-	O	P	D	Item	Type	Z	D+	D-	O	P	D
1	CR	0.98	0.01	0.00	1.99	1.98	0.00	69	MC	2.11	0.03	-0.02	0.72	0.70	0.02
1A	CR	3.38	0.04	0.00	1.64	1.60	0.04	70	MC	2.44	0.03	0.00	0.74	0.71	0.02
1B	CR	-6.35	0.06	-0.07	1.73	1.78	-0.06	71	CR	3.24	0.08	0.00	3.30	3.25	0.05
1C	CR	2.47	0.03	0.00	1.94	1.92	0.02	72	MC	-1.19	0.01	-0.03	0.51	0.53	-0.01
1D	CR	1.42	0.02	0.00	1.98	1.97	0.01	73	MC	1.23	0.03	-0.02	0.50	0.49	0.01
1E	CR	-0.55	0.02	-0.02	1.86	1.86	0.00	74	MC	-1.31	0.02	-0.03	0.30	0.31	-0.01
1F	CR	-4.70	0.01	-0.04	1.74	1.78	-0.04	75	MC	-6.08	0.02	-0.08	0.38	0.42	-0.07
2A	CR	5.98	0.11	0.00	3.38	3.27	0.109+	76	MC	-1.79	0.03	-0.03	0.62	0.63	-0.02
2B	CR	7.25	0.11	0.00	3.45	3.35	0.108+	77	MC	0.17	0.01	-0.05	0.82	0.82	0.00
2C	CR	5.96	0.06	0.00	2.66	2.60	0.06	78	MC	0.70	0.04	-0.03	0.72	0.71	0.01
27	CR	-1.05	0.04	-0.09	3.06	3.08	-0.02	79	MC	2.18	0.03	-0.02	0.54	0.52	0.02
53	MC	1.66	0.03	-0.01	0.81	0.79	0.02	80	MC	-0.81	0.03	-0.04	0.75	0.75	-0.01
54	MC	-1.75	0.01	-0.03	0.38	0.39	-0.02	81	MC	0.67	0.03	-0.04	0.60	0.59	0.01
55	MC	0.09	0.05	-0.02	0.53	0.53	0.00	82	MC	1.74	0.01	-0.05	0.95	0.94	0.01
56	MC	-2.83	0.01	-0.04	0.32	0.35	-0.03	83	MC	1.91	0.03	-0.07	0.87	0.86	0.01
57	MC	-0.26	0.02	-0.04	0.38	0.38	0.00	84	MC	2.48	0.05	-0.03	0.70	0.67	0.03
58	MC	2.38	0.04	-0.02	0.52	0.50	0.03	85	MC	2.43	0.02	-0.04	0.78	0.75	0.02
58A	CR	2.94	0.04	-0.02	1.65	1.62	0.03	86	MC	-4.05	0.01	-0.05	0.38	0.42	-0.04
58B	CR	0.02	0.00	-0.01	1.02	1.02	0.00	87	MC	0.20	0.03	-0.04	0.57	0.57	0.00
59C	CR	-1.71	0.02	-0.04	1.42	1.43	-0.02	88	MC	-4.36	0.00	-0.05	0.51	0.55	-0.05
59D	CR	0.47	0.03	-0.04	1.78	1.78	0.00	89	MC	-3.80	0.04	-0.08	0.31	0.35	-0.04
60	MC	-8.52	0.03	-0.04	0.90	0.93	-0.03	90	MC	-5.34	0.01	-0.06	0.65	0.71	-0.05
61	MC	2.14	0.04	-0.02	0.69	0.67	0.02	91	MC	-1.90	0.02	-0.04	0.67	0.69	-0.02
62	MC	-2.27	0.02	-0.04	0.69	0.71	-0.02	92	MC	1.08	0.02	-0.01	0.83	0.82	0.01
63	MC	1.63	0.03	-0.03	0.81	0.80	0.01	93	MC	-3.06	0.01	-0.04	0.53	0.56	-0.03
64	MC	-3.80	0.02	-0.06	0.43	0.47	-0.04	94	MC	-6.26	0.04	-0.07	0.34	0.39	-0.06
65	MC	-0.10	0.03	-0.02	0.77	0.77	0.01	95	MC	2.14	0.03	-0.03	0.25	0.23	0.02
66	MC	-6.01	0.01	-0.07	0.34	0.41	-0.06	96	MC	-4.13	0.02	-0.05	0.41	0.45	-0.05
67	MC	-1.45	0.02	-0.03	0.59	0.61	-0.02	97	CR	1.76	0.07	-0.08	3.38	3.35	0.03
68	MC	-0.28	0.02	-0.02	0.83	0.84	0.00								

Appendix B-20. Differential Item Functioning Analysis, Grade 7, Writing, Hispanic (N=5,201)

Item	Type	Z	D+	D-	O	P	D	Item	Type	Z	D+	D-	O	P	D
1	CR	-3.62	0.00	-0.01	1.98	1.98	-0.01	69	MC	5.28	0.05	-0.03	0.71	0.68	0.03
1A	CR	5.95	0.04	0.00	1.62	1.58	0.04	70	MC	-0.09	0.02	-0.02	0.69	0.69	0.00
1B	CR	-9.01	0.01	-0.06	1.71	1.76	-0.05	71	CR	6.96	0.08	-0.02	3.25	3.18	0.07
1C	CR	-4.78	0.00	-0.04	1.88	1.90	-0.03	72	MC	1.29	0.01	-0.01	0.51	0.50	0.01
1D	CR	-0.97	0.01	-0.01	1.96	1.96	0.00	73	MC	3.22	0.03	-0.01	0.49	0.47	0.02
1E	CR	1.55	0.02	-0.03	1.85	1.85	0.01	74	MC	0.35	0.02	-0.01	0.30	0.30	0.00
1F	CR	-6.69	0.00	-0.04	1.73	1.76	-0.04	75	MC	-7.68	0.00	-0.06	0.35	0.40	-0.05
2A	CR	7.20	0.08	0.00	3.28	3.21	0.08	76	MC	-0.04	0.01	-0.01	0.60	0.60	0.00
2B	CR	5.99	0.06	-0.01	3.34	3.29	0.05	77	MC	4.03	0.03	-0.02	0.82	0.80	0.02
2C	CR	6.42	0.04	0.00	2.60	2.56	0.04	78	MC	1.84	0.02	-0.03	0.70	0.69	0.01
27	CR	5.25	0.06	0.00	3.07	3.02	0.06	79	MC	3.47	0.03	0.00	0.52	0.50	0.02
53	MC	-0.04	0.01	-0.01	0.77	0.77	0.00	80	MC	-0.39	0.02	-0.02	0.73	0.73	0.00
54	MC	-4.54	0.00	-0.03	0.35	0.36	-0.03	81	MC	1.54	0.03	-0.02	0.59	0.58	0.01
55	MC	-2.65	0.02	-0.02	0.50	0.52	-0.02	82	MC	3.81	0.01	0.00	0.96	0.93	0.01
56	MC	-1.78	0.02	-0.02	0.32	0.33	-0.01	83	MC	3.91	0.03	-0.01	0.87	0.85	0.02
57	MC	-5.89	0.00	-0.04	0.33	0.37	-0.04	84	MC	0.57	0.03	-0.02	0.68	0.68	0.00
58	MC	0.42	0.02	-0.02	0.48	0.48	0.00	85	MC	4.42	0.02	0.00	0.76	0.72	0.02
59A	CR	-1.71	0.01	-0.03	1.59	1.60	-0.01	86	MC	-5.51	0.05	-0.06	0.36	0.40	-0.04
59B	CR	0.10	0.00	0.00	1.02	1.02	0.00	87	MC	0.87	0.02	-0.02	0.55	0.54	0.01
59C	CR	1.36	0.02	-0.01	1.42	1.41	0.01	88	MC	-8.02	0.06	-0.06	0.47	0.52	-0.05
59D	CR	0.26	0.02	-0.03	1.76	1.76	0.00	89	MC	-7.01	0.02	-0.05	0.29	0.33	-0.04
60	MC	-5.57	0.00	-0.02	0.91	0.92	-0.02	90	MC	-1.57	0.01	-0.02	0.87	0.88	-0.01
61	MC	-5.70	0.00	-0.05	0.61	0.65	-0.04	91	MC	-3.26	0.02	-0.03	0.66	0.67	-0.02
62	MC	-0.70	0.02	-0.06	0.68	0.69	-0.01	92	MC	3.62	0.02	-0.01	0.82	0.80	0.02
63	MC	-2.09	0.01	-0.04	0.77	0.78	-0.01	93	MC	-3.89	0.04	-0.04	0.51	0.54	-0.03
64	MC	-3.47	0.00	-0.03	0.44	0.46	-0.02	94	MC	-2.92	0.01	-0.04	0.35	0.37	-0.02
65	MC	-5.95	0.00	-0.03	0.71	0.75	-0.03	95	MC	-3.12	0.02	-0.04	0.18	0.21	-0.02
66	MC	-5.27	0.01	-0.04	0.35	0.39	-0.03	96	MC	-5.66	0.00	-0.04	0.40	0.44	-0.04
67	MC	0.15	0.02	-0.02	0.59	0.58	0.00	97	CR	5.58	0.06	-0.03	3.35	3.28	0.08
68	MC	3.28	0.02	0.00	0.83	0.82	0.01								

Appendix B-21. Differential Item Functioning Analysis, Grade 8, Mathematics, Male (N=24,866)

Item	Type	Z	D+	D-	O	P	D	Item	Type	Z	D+	D-	O	P	D
1	MC	-1.90	0.01	-0.01	0.83	0.84	0.00	31	MC	1.82	0.00	0.00	0.77	0.76	0.00
2	MC	-7.42	0.01	-0.03	0.72	0.74	-0.02	32	MC	5.25	0.02	0.00	0.54	0.52	0.01
3	MC	7.19	0.03	-0.01	0.55	0.53	0.02	33	CR	-5.16	0.02	-0.06	1.77	1.78	-0.02
4	MC	9.44	0.02	0.00	0.52	0.50	0.02	34	MC	4.29	0.04	-0.02	0.67	0.66	0.01
5	MC	-10.18	0.01	-0.05	0.56	0.61	-0.03	35	MC	6.73	0.02	0.00	0.53	0.51	0.02
6	CR	5.58	0.03	-0.02	1.96	1.97	0.01	36	CR	-3.53	0.03	-0.04	2.08	2.09	-0.01
7	MC	1.51	0.01	0.00	0.59	0.58	0.00	37	MC	-7.14	0.00	-0.03	0.42	0.44	-0.02
8	MC	8.61	0.03	0.00	0.56	0.56	0.03	38	MC	8.71	0.02	0.00	0.78	0.76	0.02
9	MC	2.77	0.01	-0.01	0.39	0.38	0.01	39	CR	-13.06	0.00	-0.07	1.69	1.75	-0.07
10	MC	11.36	0.03	0.00	0.68	0.65	0.03	40	CR	-4.86	0.02	-0.04	2.85	2.88	-0.03
11	CR	-5.81	0.00	-0.03	1.56	1.58	-0.02	41	MC	-1.16	0.03	-0.01	0.51	0.51	0.00
12	MC	-1.84	0.02	-0.01	0.66	0.66	-0.01	42	MC	2.94	0.02	-0.01	0.71	0.70	0.01
13	MC	-6.08	0.00	-0.03	0.46	0.48	-0.02	43	MC	8.42	0.02	-0.01	0.55	0.53	0.02
14	MC	4.56	0.02	0.00	0.82	0.81	0.01	44	MC	-5.69	0.05	-0.03	0.30	0.32	-0.02
15	MC	4.82	0.02	0.00	0.49	0.48	0.01	45	MC	18.64	0.05	0.00	0.54	0.49	0.05
16	CR	-6.99	0.02	-0.04	2.40	2.43	-0.03	46	MC	-2.46	0.01	-0.02	0.75	0.76	-0.01
17	MC	-2.66	0.01	-0.01	0.86	0.86	0.00	47	MC	-8.68	0.00	-0.03	0.59	0.61	-0.03
18	MC	12.97	0.04	0.00	0.62	0.58	0.04	48	CR	-10.43	0.00	-0.04	2.33	2.37	-0.04
19	CR	21.98	0.10	0.00	2.10	1.99	0.105+	49	MC	-1.29	0.01	-0.01	0.85	0.85	0.00
20	CR	-7.51	0.04	-0.12	3.09	3.16	-0.06	50	MC	-3.21	0.01	-0.02	0.70	0.71	-0.01
21	MC	9.89	0.03	0.00	0.60	0.57	0.03	51	MC	7.97	0.02	0.00	0.89	0.87	0.02
22	MC	8.32	0.03	-0.02	0.55	0.53	0.02	52	MC	6.97	0.02	0.00	0.64	0.62	0.02
23	MC	14.02	0.04	0.00	0.43	0.39	0.04	53	CR	-11.30	0.00	-0.04	2.26	2.29	-0.04
24	MC	-2.69	0.01	-0.01	0.22	0.23	-0.01	54	MC	-6.08	0.04	-0.02	0.55	0.56	-0.02
25	MC	-7.57	0.01	-0.02	0.64	0.66	-0.02	55	MC	10.97	0.03	0.00	0.78	0.75	0.03
26	MC	3.62	0.03	-0.01	0.20	0.19	0.01	56	CR	-14.02	0.01	-0.06	1.76	1.81	-0.05
27	MC	-3.66	0.02	-0.01	0.68	0.69	-0.01	57	MC	-0.15	0.03	-0.02	0.40	0.40	0.00
28	CR	-7.63	0.01	-0.04	2.54	2.56	-0.02	58	MC	-0.66	0.01	-0.01	0.62	0.62	0.00
29	MC	14.48	0.07	-0.02	0.41	0.37	0.04	59	CR	2.28	0.01	-0.03	2.39	2.36	0.01
30	MC	3.33	0.02	-0.03	0.58	0.57	0.01	60	CR	-24.90	0.00	-0.15	2.58	2.73	-0.150*

Appendix B-22. Differential Item Functioning Analysis. Grade 8. Mathematics. Female (N=24,239)

Item	Type	Z	D+	D-	O	P	D	Item	Type	Z	D+	D-	O	P	D
1	MC	5.71	0.02	0.00	0.85	0.84	0.02	31	MC	1.11	0.01	-0.01	0.76	0.76	0.00
2	MC	8.77	0.03	-0.01	0.76	0.74	0.02	32	MC	-6.82	0.00	-0.02	0.49	0.51	-0.02
3	MC	-7.27	0.01	-0.03	0.51	0.53	-0.02	33	CR	0.96	0.05	-0.05	1.77	1.76	0.01
4	MC	-7.80	0.00	-0.02	0.46	0.48	-0.02	34	MC	-4.25	0.02	-0.05	0.64	0.65	-0.01
5	MC	10.01	0.03	0.00	0.62	0.59	0.03	35	MC	-7.39	0.01	-0.03	0.48	0.50	-0.02
6	CR	-3.90	0.03	-0.04	1.92	1.94	-0.02	36	CR	2.20	0.04	-0.03	2.08	2.06	0.01
7	MC	-2.67	0.01	-0.02	0.56	0.57	-0.01	37	MC	4.87	0.02	-0.01	0.43	0.42	0.01
8	MC	-10.09	0.00	-0.03	0.51	0.54	-0.03	38	MC	-8.35	0.00	-0.02	0.73	0.75	-0.02
9	MC	-5.61	0.02	-0.02	0.35	0.36	-0.01	39	CR	10.19	0.08	-0.01	1.78	1.72	0.06
10	MC	-10.14	0.00	-0.03	0.62	0.65	-0.03	40	CR	4.59	0.04	-0.01	2.86	2.84	0.03
11	CR	0.47	0.03	-0.01	1.55	1.54	0.01	41	MC	0.90	0.02	-0.03	0.51	0.50	0.00
12	MC	2.83	0.01	-0.01	0.67	0.66	0.01	42	MC	-2.11	0.02	-0.02	0.70	0.70	-0.01
13	MC	7.01	0.02	0.00	0.49	0.47	0.02	43	MC	-10.61	0.00	-0.03	0.48	0.51	-0.03
14	MC	-1.49	0.01	-0.01	0.80	0.81	0.00	44	MC	3.40	0.04	-0.03	0.31	0.30	0.01
15	MC	-6.69	0.00	-0.02	0.44	0.46	-0.02	45	MC	-20.40	0.00	-0.06	0.41	0.47	-0.06
16	CR	11.86	0.05	0.00	2.46	2.42	0.04	46	MC	4.17	0.01	0.00	0.76	0.75	0.01
17	MC	8.02	0.02	0.00	0.88	0.87	0.01	47	MC	8.63	0.02	0.00	0.63	0.60	0.03
18	MC	-12.11	0.00	-0.04	0.54	0.57	-0.04	48	CR	12.57	0.05	0.00	2.41	2.36	0.05
19	CR	-22.60	0.00	-0.11	1.85	1.96	-0.111*	49	MC	2.62	0.02	-0.01	0.86	0.85	0.01
20	CR	10.68	0.07	0.00	3.17	3.10	0.07	50	MC	4.59	0.03	-0.01	0.71	0.70	0.01
21	MC	-11.27	0.00	-0.04	0.52	0.56	-0.03	51	MC	-5.39	0.00	-0.01	0.87	0.88	-0.01
22	MC	-7.52	0.01	-0.03	0.50	0.52	-0.02	52	MC	-7.12	0.01	-0.02	0.59	0.61	-0.02
23	MC	-17.18	0.04	-0.06	0.32	0.37	-0.05	53	CR	12.90	0.06	-0.02	2.34	2.28	0.06
24	MC	-0.26	0.02	-0.01	0.21	0.21	0.00	54	MC	4.87	0.02	-0.02	0.86	0.85	0.01
25	MC	7.94	0.02	0.00	0.67	0.65	0.02	55	MC	-9.82	0.00	-0.03	0.72	0.74	-0.03
26	MC	-6.80	0.01	-0.03	0.16	0.18	-0.02	56	CR	12.77	0.06	-0.02	1.85	1.79	0.06
27	MC	5.54	0.02	-0.02	0.70	0.68	0.01	57	MC	-3.93	0.01	-0.02	0.37	0.38	-0.01
28	CR	7.78	0.09	-0.01	2.60	2.56	0.04	58	MC	1.56	0.02	-0.01	0.83	0.82	0.01
29	MC	-18.41	0.11	-0.07	0.30	0.35	-0.05	59	CR	1.01	0.03	-0.01	2.38	2.38	0.01
30	MC	-5.40	0.05	-0.02	0.54	0.55	-0.02	60	CR	21.47	0.14	0.00	2.81	2.67	0.143+

Appendix B-23. Differential Item Functioning Analysis. Grade 8. Mathematics. African American (2,343)

Item	Type	Z	D+	D-	O	P	D	Item	Type	Z	D+	D-	O	P	D
1	MC	0.18	0.04	-0.02	0.73	0.72	0.01	31	MC	5.96	0.05	0.00	0.63	0.58	0.05
2	MC	2.92	0.04	0.00	0.83	0.80	0.03	32	MC	2.35	0.03	-0.01	0.40	0.38	0.02
3	MC	0.74	0.03	-0.02	0.50	0.49	0.01	33	CR	-3.97	0.04	-0.08	1.48	1.49	-0.03
4	MC	-1.73	0.01	-0.02	0.29	0.30	-0.01	34	MC	-2.29	0.02	-0.04	0.55	0.57	-0.02
5	MC	2.97	0.04	-0.02	0.45	0.43	0.03	35	MC	-1.67	0.04	-0.05	0.36	0.38	-0.02
6	CR	-4.30	0.02	-0.06	1.65	1.60	-0.05	36	CR	-7.20	0.00	-0.09	1.81	1.71	-0.09
7	MC	-0.02	0.01	-0.02	0.40	0.40	0.00	37	MC	1.08	0.03	-0.01	0.28	0.26	0.01
8	MC	-3.62	0.03	-0.05	0.42	0.46	-0.04	38	MC	-0.80	0.03	-0.04	0.83	0.84	-0.01
9	MC	-5.86	0.00	-0.05	0.16	0.21	-0.05	39	CR	2.33	0.06	-0.02	1.45	1.41	0.04
10	MC	-0.69	0.02	-0.02	0.50	0.50	-0.01	40	CR	1.55	0.05	-0.05	2.32	2.28	0.03
11	CR	-1.49	0.02	-0.03	1.25	1.26	-0.01	41	MC	-1.20	0.02	-0.04	0.37	0.38	-0.01
12	MC	-3.54	0.02	-0.05	0.50	0.54	-0.03	42	MC	-0.78	0.02	-0.03	0.63	0.64	-0.01
13	MC	2.19	0.03	-0.02	0.37	0.35	0.02	43	MC	-3.18	0.01	-0.03	0.30	0.33	-0.03
14	MC	0.72	0.04	-0.04	0.69	0.68	0.02	44	MC	-1.20	0.03	-0.03	0.22	0.23	-0.01
15	MC	-0.80	0.03	-0.03	0.31	0.32	0.00	45	MC	-1.20	0.01	-0.02	0.27	0.28	-0.01
16	CR	-3.40	0.00	-0.05	2.16	2.20	-0.04	46	MC	2.07	0.04	-0.01	0.65	0.63	0.02
17	MC	1.77	0.03	-0.02	0.79	0.77	0.02	47	MC	1.23	0.02	-0.02	0.48	0.47	0.01
18	MC	-2.54	0.02	-0.04	0.44	0.47	-0.03	48	CR	-3.00	0.04	-0.05	1.94	1.98	-0.04
19	CR	-2.26	0.02	-0.05	1.56	1.60	-0.03	49	MC	3.08	0.03	-0.01	0.80	0.77	0.03
20	CR	2.63	0.07	-0.01	2.42	2.36	0.05	50	MC	7.43	0.07	0.00	0.63	0.56	0.07
21	MC	1.67	0.04	-0.03	0.43	0.41	0.02	51	MC	-2.67	0.02	-0.03	0.77	0.79	-0.02
22	MC	3.83	0.05	-0.04	0.42	0.39	0.03	52	MC	-1.28	0.01	-0.02	0.43	0.44	-0.01
23	MC	-3.91	0.04	-0.05	0.21	0.25	-0.04	53	CR	6.16	0.09	0.00	2.11	2.02	0.09
24	MC	1.23	0.02	-0.01	0.13	0.12	0.01	54	MC	1.91	0.03	-0.02	0.44	0.42	0.02
25	MC	-3.04	0.02	-0.04	0.46	0.49	-0.03	55	MC	-4.02	0.01	-0.05	0.57	0.60	-0.04
26	MC	-0.48	0.06	-0.03	0.14	0.14	0.00	56	CR	1.29	0.07	-0.03	1.58	1.56	0.02
27	MC	1.55	0.02	-0.03	0.56	0.54	0.01	57	MC	-2.48	0.03	-0.04	0.20	0.22	-0.02
28	CR	-2.67	0.03	-0.08	2.23	2.27	-0.03	58	MC	4.85	0.04	0.00	0.76	0.72	0.04
29	MC	0.53	0.06	-0.08	0.24	0.24	0.00	59	CR	4.22	0.08	-0.02	2.09	2.03	0.06
30	MC	1.06	0.05	-0.04	0.40	0.39	0.01	60	CR	2.96	0.10	-0.05	2.11	2.04	0.07

Appendix B-24. Differential Item Functioning Analysis, Grade 8, Mathematics, Hispanic (N=6,870)

Item	Type	Z	D+	D-	O	P	D	Item	Type	Z	D+	D-	O	P	D
1	MC	4.10	0.03	0.00	0.76	0.74	0.02	31	MC	-1.21	0.01	-0.01	0.60	0.60	-0.01
2	MC	1.76	0.03	-0.02	0.63	0.62	0.01	32	MC	4.09	0.03	-0.01	0.41	0.39	0.02
3	MC	4.59	0.04	-0.02	0.52	0.49	0.03	33	CR	-4.60	0.04	-0.05	1.50	1.52	-0.02
4	MC	2.12	0.02	-0.02	0.33	0.32	0.01	34	MC	-0.40	0.03	-0.04	0.56	0.56	0.00
5	MC	-5.06	0.00	-0.03	0.42	0.45	-0.03	35	MC	0.62	0.02	-0.01	0.39	0.39	0.00
6	CR	0.77	0.02	-0.03	1.84	1.84	0.00	36	CR	-3.18	0.04	-0.03	1.74	1.75	-0.02
7	MC	-1.63	0.02	-0.02	0.41	0.42	-0.01	37	MC	-0.66	0.01	-0.01	0.28	0.28	0.00
8	MC	2.21	0.03	-0.01	0.48	0.47	0.01	38	MC	0.48	0.01	-0.01	0.66	0.66	0.00
9	MC	-0.53	0.01	-0.01	0.23	0.23	0.00	39	CR	-1.02	0.03	-0.02	1.45	1.45	0.00
10	MC	3.47	0.02	-0.01	0.54	0.52	0.02	40	CR	4.39	0.07	-0.02	2.40	2.36	0.05
11	CR	-2.13	0.01	-0.01	1.28	1.29	-0.01	41	MC	2.31	0.02	-0.02	0.41	0.40	0.01
12	MC	-3.15	0.03	-0.02	0.54	0.55	-0.02	42	MC	1.75	0.02	-0.01	0.68	0.64	0.01
13	MC	4.69	0.04	-0.02	0.39	0.36	0.03	43	MC	-1.62	0.01	-0.03	0.34	0.35	-0.01
14	MC	5.44	0.03	0.00	0.73	0.70	0.03	44	MC	2.80	0.06	-0.03	0.25	0.24	0.01
15	MC	-1.35	0.02	-0.02	0.32	0.33	-0.01	45	MC	-2.54	0.02	-0.02	0.29	0.31	-0.01
16	CR	-0.11	0.01	-0.03	2.23	2.23	0.00	46	MC	2.77	0.02	-0.01	0.88	0.85	0.02
17	MC	2.64	0.02	0.00	0.80	0.79	0.01	47	MC	4.15	0.03	-0.02	0.51	0.48	0.02
18	MC	-5.40	0.04	-0.04	0.45	0.48	-0.03	48	CR	-3.06	0.02	-0.03	2.01	2.03	-0.02
19	CR	-2.31	0.02	-0.04	1.82	1.84	-0.02	49	MC	2.36	0.02	-0.02	0.80	0.79	0.01
20	CR	4.85	0.09	-0.05	2.50	2.46	0.04	50	MC	1.84	0.01	-0.02	0.59	0.58	0.01
21	MC	3.06	0.02	-0.02	0.44	0.43	0.02	51	MC	-3.10	0.03	-0.02	0.80	0.81	-0.01
22	MC	-2.95	0.02	-0.01	0.39	0.40	-0.02	52	MC	-3.79	0.03	-0.03	0.44	0.46	-0.02
23	MC	-2.19	0.04	-0.04	0.25	0.26	-0.01	53	CR	-0.91	0.04	-0.03	2.06	2.06	0.00
24	MC	-1.79	0.02	-0.01	0.13	0.13	-0.01	54	MC	0.52	0.02	-0.01	0.44	0.43	0.00
25	MC	1.22	0.01	-0.01	0.51	0.51	0.01	55	MC	0.13	0.01	-0.02	0.82	0.82	0.00
26	MC	2.91	0.03	-0.02	0.16	0.15	0.01	56	CR	-3.07	0.06	-0.04	1.57	1.59	-0.02
27	MC	2.14	0.02	-0.02	0.57	0.56	0.01	57	MC	-4.01	0.04	-0.03	0.22	0.24	-0.02
28	CR	6.07	0.09	-0.07	2.37	2.31	0.06	58	MC	4.10	0.03	-0.02	0.76	0.74	0.02
29	MC	2.27	0.10	-0.03	0.26	0.25	0.01	59	CR	2.59	0.02	0.00	2.10	2.08	0.02
30	MC	-1.89	0.05	-0.04	0.39	0.41	-0.01	60	CR	-2.57	0.03	-0.05	2.10	2.11	-0.01

Appendix B-25. Differential Item Functioning Analysis, Grade 8, Science, Male (N=24,939)

Item	Type	Z	D+	D-	O	P	D	Item	Type	Z	D+	D-	O	P	D
1	MC	-2.91	0.02	-0.02	0.46	0.47	-0.01	40	MC	0.02	0.01	-0.01	0.65	0.65	0.00
2	MC	8.98	0.02	0.00	0.84	0.82	0.02	41	MC	24.40	0.07	0.00	0.67	0.60	0.07
3	MC	8.50	0.02	0.00	0.36	0.33	0.02	42	CR	-4.45	0.01	-0.02	1.43	1.44	-0.01
5	MC	7.16	0.02	0.00	0.84	0.82	0.02	43	MC	-6.20	0.00	-0.01	0.72	0.73	-0.01
6	MC	-1.20	0.01	-0.01	0.77	0.78	0.00	44	MC	1.96	0.02	-0.01	0.53	0.52	0.01
7	MC	-9.10	0.00	-0.03	0.48	0.50	-0.03	45	MC	15.70	0.04	0.00	0.72	0.67	0.04
8	MC	16.75	0.03	0.00	0.90	0.87	0.03	46	MC	-2.92	0.00	-0.01	0.73	0.74	-0.01
9	MC	1.99	0.01	0.00	0.86	0.85	0.01	47	MC	15.70	0.06	-0.01	0.71	0.67	0.05
11	MC	6.47	0.01	0.00	0.74	0.72	0.02	48	MC	-3.86	0.01	-0.02	0.56	0.58	-0.01
12	MC	10.02	0.03	0.00	0.76	0.73	0.03	49	MC	-4.87	0.00	-0.01	0.93	0.94	-0.01
13	MC	28.12	0.07	0.00	0.80	0.73	0.07	50	MC	8.58	0.02	0.00	0.74	0.72	0.02
14	MC	-2.49	0.01	-0.01	0.63	0.63	-0.01	51	MC	2.24	0.01	0.00	0.51	0.51	0.01
15	MC	2.18	0.01	-0.01	0.43	0.42	0.01	52	MC	-11.33	0.00	-0.03	0.73	0.75	-0.03
16	MC	-4.89	0.00	-0.01	0.57	0.58	-0.01	53	CR	9.19	0.05	0.00	2.41	2.36	0.05
17	MC	-5.93	0.00	-0.01	0.86	0.87	-0.01	54	MC	-4.02	0.00	-0.01	0.74	0.75	-0.01
18	MC	0.64	0.01	0.00	0.77	0.76	0.00	55	MC	-9.66	0.00	-0.03	0.79	0.82	-0.02
19	MC	10.36	0.03	0.00	0.60	0.57	0.03	56	MC	2.01	0.01	-0.01	0.78	0.78	0.00
20	CR	-27.12	0.00	-0.12	2.15	2.27	-0.118*	57	MC	-1.07	0.01	0.00	0.94	0.94	0.00
21	CR	-15.89	0.00	-0.07	2.05	2.12	-0.07	58	MC	-1.20	0.01	-0.02	0.42	0.42	0.00
22	CR	0.28	0.01	-0.01	1.74	1.74	0.00	59	MC	4.10	0.02	-0.01	0.83	0.82	0.01
23	CR	-16.49	0.00	-0.07	3.32	3.39	-0.07	60	MC	3.97	0.03	-0.01	0.25	0.24	0.01
24	CR	-27.84	0.00	-0.22	2.86	3.08	-0.216*	61	CR	6.06	0.04	-0.01	1.86	1.82	0.03
25	CR	-8.79	0.00	-0.03	2.44	2.47	-0.03	62	MC	15.18	0.04	0.00	0.80	0.76	0.04
26	MC	4.80	0.01	0.00	0.91	0.90	0.01	63	MC	-0.27	0.01	-0.01	0.59	0.60	0.00
27	MC	1.21	0.01	-0.01	0.72	0.72	0.00	64	CR	-7.49	0.04	-0.04	2.32	2.36	-0.03
28	MC	12.34	0.03	0.00	0.74	0.71	0.03	65	MC	-4.32	0.01	-0.02	0.71	0.72	-0.01
29	CR	-11.49	0.00	-0.03	1.62	1.65	-0.03	66	MC	9.76	0.03	-0.02	0.66	0.63	0.03
30	MC	-2.13	0.01	-0.01	0.40	0.41	-0.01	67	MC	-4.43	0.00	-0.02	0.73	0.74	-0.01
31	CR	-11.14	0.00	-0.04	1.31	1.35	-0.04	68	MC	5.94	0.02	0.00	0.82	0.80	0.02
32	MC	-2.30	0.01	-0.01	0.55	0.56	-0.01	69	CR	-13.65	0.01	-0.04	1.40	1.43	-0.04
33	MC	7.56	0.01	0.00	0.91	0.89	0.01	70	MC	-5.12	0.01	-0.02	0.81	0.83	-0.01
34	MC	4.66	0.01	0.00	0.91	0.90	0.01	71	MC	-14.83	0.00	-0.04	0.76	0.79	-0.04
35	CR	15.15	0.06	0.00	1.85	1.79	0.06	72	MC	-7.49	0.00	-0.01	0.87	0.89	-0.01
36	CR	-0.38	0.04	-0.02	2.59	2.58	0.01	73	MC	-2.56	0.00	-0.02	0.86	0.87	-0.01
37	MC	0.97	0.01	-0.01	0.82	0.81	0.00	74	MC	-7.00	0.00	-0.02	0.69	0.70	-0.02
38	MC	1.49	0.01	-0.01	0.43	0.43	0.00	75	MC	-2.96	0.00	0.00	0.84	0.85	0.00
39	MC	1.15	0.01	0.00	0.74	0.73	0.00								

Appendix B-28. Differential Item Functioning Analysis, Grade 8, Science, Female (N=24,386)

Item	Type	Z	D+	D-	O	P	D	Item	Type	Z	D+	D-	O	P	D
1	MC	1.72	0.02	-0.01	0.45	0.45	0.01	40	MC	-0.59	0.01	-0.01	0.60	0.60	0.00
2	MC	-7.40	0.00	-0.02	0.76	0.78	-0.02	41	MC	-26.76	0.00	-0.08	0.47	0.55	-0.08
3	MC	-11.36	0.00	-0.03	0.26	0.30	-0.03	42	CR	3.73	0.02	-0.01	1.41	1.40	0.01
5	MC	-6.26	0.00	-0.02	0.78	0.79	-0.02	43	MC	6.24	0.02	-0.01	0.70	0.69	0.01
6	MC	2.56	0.01	-0.01	0.75	0.74	0.01	44	MC	-3.72	0.01	-0.02	0.48	0.47	-0.01
7	MC	8.30	0.03	0.00	0.49	0.46	0.03	45	MC	-18.13	0.06	-0.08	0.58	0.63	-0.05
8	MC	-14.50	0.00	-0.04	0.81	0.84	-0.03	46	MC	4.11	0.01	-0.01	0.70	0.70	0.01
9	MC	0.38	0.01	-0.01	0.63	0.63	0.00	47	MC	-17.48	0.00	-0.05	0.57	0.62	-0.05
11	MC	-5.80	0.00	-0.02	0.67	0.68	-0.02	48	MC	2.56	0.01	-0.01	0.53	0.52	0.01
12	MC	-10.32	0.00	-0.03	0.67	0.70	-0.03	49	MC	9.01	0.02	0.00	0.94	0.93	0.02
13	MC	-27.96	0.00	-0.08	0.61	0.69	-0.08	50	MC	-8.97	0.01	-0.02	0.86	0.88	-0.02
14	MC	0.88	0.01	-0.01	0.59	0.59	0.00	51	MC	-3.98	0.01	-0.01	0.46	0.47	-0.01
15	MC	-5.52	0.00	-0.02	0.35	0.37	-0.02	52	MC	11.33	0.04	-0.01	0.76	0.73	0.03
16	MC	2.01	0.02	-0.02	0.53	0.53	0.01	53	CR	-8.73	0.03	-0.06	2.24	2.29	-0.05
17	MC	9.29	0.02	0.00	0.86	0.86	0.02	54	MC	5.65	0.01	0.00	0.72	0.71	0.01
18	MC	-0.38	0.01	-0.02	0.73	0.73	0.00	55	MC	11.03	0.03	0.00	0.82	0.80	0.03
19	MC	-11.47	0.00	-0.04	0.50	0.53	-0.04	56	MC	-1.82	0.01	-0.02	0.72	0.73	0.00
20	CR	25.31	0.12	0.00	2.31	2.19	0.119+	57	MC	5.19	0.01	0.00	0.94	0.93	0.01
21	CR	14.39	0.09	-0.02	2.10	2.03	0.07	58	MC	0.44	0.01	-0.01	0.40	0.40	0.00
22	CR	4.12	0.02	-0.04	1.71	1.70	0.01	59	MC	-3.58	0.01	-0.02	0.78	0.80	-0.01
23	CR	17.70	0.08	0.00	3.41	3.33	0.08	60	MC	-7.44	0.02	-0.02	0.18	0.20	-0.02
24	CR	24.84	0.24	-0.09	3.11	2.89	0.215+	61	CR	-8.33	0.07	-0.05	1.69	1.73	-0.04
25	CR	8.31	0.05	-0.02	2.44	2.41	0.04	62	MC	-14.83	0.01	-0.05	0.69	0.73	-0.04
26	MC	-3.96	0.00	-0.01	0.88	0.89	-0.01	63	MC	-0.78	0.02	-0.01	0.55	0.56	0.00
27	MC	-1.04	0.00	-0.01	0.67	0.67	0.00	64	CR	4.57	0.03	0.00	2.26	2.23	0.02
28	MC	-12.37	0.00	-0.03	0.64	0.67	-0.03	65	MC	3.85	0.02	-0.01	0.70	0.69	0.01
29	CR	11.15	0.04	-0.01	1.65	1.62	0.03	66	MC	-10.90	0.00	-0.03	0.56	0.59	-0.03
30	MC	-1.45	0.02	-0.02	0.35	0.35	0.00	67	MC	5.40	0.01	0.00	0.71	0.70	0.01
31	CR	9.54	0.04	-0.02	1.34	1.31	0.04	68	MC	-8.48	0.00	-0.03	0.52	0.54	-0.03
32	MC	0.02	0.02	-0.01	0.51	0.51	0.00	69	CR	10.92	0.06	-0.02	1.43	1.40	0.04
33	MC	-3.34	0.00	-0.02	0.87	0.88	-0.01	70	MC	5.97	0.02	-0.01	0.82	0.80	0.02
34	MC	-0.61	0.01	-0.01	0.68	0.69	0.00	71	MC	17.07	0.04	0.00	0.80	0.76	0.04
35	CR	-19.68	0.00	-0.09	1.58	1.67	-0.09	72	MC	9.34	0.02	0.00	0.89	0.87	0.02
36	CR	0.73	0.02	-0.02	2.53	2.53	0.00	73	MC	5.52	0.02	0.00	0.87	0.86	0.01
37	MC	0.26	0.01	-0.01	0.78	0.78	0.00	74	MC	7.18	0.02	-0.01	0.68	0.67	0.02
38	MC	-4.71	0.02	-0.03	0.37	0.38	-0.01	75	MC	3.48	0.01	-0.01	0.83	0.82	0.01
39	MC	-1.31	0.01	-0.01	0.69	0.69	-0.01								

Appendix B-27. Differential Item Functioning Analysis. Grade 8. Science. African American (N=2,360)

Item	Type	Z	D+	D-	O	P	D	Item	Type	Z	D+	D-	O	P	D
1	MC	-2.50	0.03	-0.04	0.37	0.39	-0.02	40	MC	4.61	0.05	-0.02	0.51	0.47	0.04
2	MC	2.87	0.03	-0.01	0.71	0.68	0.03	41	MC	-0.54	0.01	-0.01	0.42	0.42	-0.01
3	MC	-2.82	0.02	-0.03	0.22	0.24	-0.02	42	CR	-4.79	0.02	-0.05	1.26	1.30	-0.04
5	MC	0.38	0.02	-0.02	0.68	0.67	0.00	43	MC	-1.39	0.02	-0.03	0.51	0.52	-0.01
6	MC	-0.16	0.02	-0.03	0.62	0.62	0.00	44	MC	1.03	0.02	-0.01	0.37	0.36	0.01
7	MC	0.78	0.02	-0.02	0.36	0.35	0.01	45	MC	-1.54	0.05	-0.06	0.54	0.55	-0.02
8	MC	-6.05	0.00	-0.06	0.70	0.75	-0.05	46	MC	-2.92	0.01	-0.03	0.52	0.54	-0.02
9	MC	-1.87	0.01	-0.03	0.69	0.71	-0.02	47	MC	-4.73	0.02	-0.05	0.44	0.48	-0.05
11	MC	1.58	0.04	-0.05	0.57	0.55	0.02	48	MC	1.50	0.02	-0.01	0.40	0.38	0.02
12	MC	-0.14	0.02	-0.03	0.61	0.61	0.00	49	MC	2.30	0.02	0.00	0.88	0.86	0.02
13	MC	0.60	0.04	-0.03	0.57	0.56	0.01	50	MC	-0.74	0.02	-0.02	0.56	0.57	-0.01
14	MC	-3.32	0.03	-0.06	0.46	0.49	-0.03	51	MC	1.28	0.02	-0.01	0.41	0.39	0.01
15	MC	-0.79	0.01	-0.03	0.26	0.27	-0.01	52	MC	5.60	0.06	0.00	0.89	0.84	0.05
16	MC	1.10	0.03	-0.03	0.43	0.42	0.01	53	CR	2.84	0.06	-0.04	2.07	2.03	0.04
17	MC	4.52	0.05	-0.01	0.81	0.76	0.04	54	MC	0.45	0.02	-0.02	0.55	0.54	0.00
18	MC	3.79	0.04	-0.01	0.84	0.81	0.03	55	MC	1.81	0.02	-0.01	0.72	0.71	0.01
19	MC	1.69	0.03	-0.04	0.48	0.44	0.02	56	MC	0.74	0.03	-0.03	0.64	0.64	0.01
20	CR	-2.40	0.04	-0.07	1.92	1.95	-0.03	57	MC	-1.47	0.00	-0.03	0.84	0.85	-0.01
21	CR	-2.47	0.06	-0.05	1.78	1.82	-0.03	58	MC	2.46	0.05	-0.01	0.38	0.35	0.03
22	CR	-4.70	0.03	-0.07	1.80	1.85	-0.05	59	MC	0.43	0.02	-0.04	0.71	0.71	0.00
23	CR	0.90	0.07	-0.05	3.09	3.07	0.02	60	MC	-1.89	0.02	-0.03	0.18	0.17	-0.02
24	CR	-4.67	0.12	-0.15	2.28	2.36	-0.100*	61	CR	0.89	0.09	-0.04	1.52	1.52	0.00
25	CR	1.25	0.04	-0.03	2.17	2.15	0.02	62	MC	-0.83	0.03	-0.05	0.81	0.82	-0.01
26	MC	-0.39	0.04	-0.02	0.81	0.82	0.00	63	MC	0.67	0.03	-0.02	0.47	0.46	0.01
27	MC	1.06	0.04	-0.01	0.64	0.63	0.01	64	CR	0.86	0.04	-0.02	2.00	1.99	0.01
28	MC	-0.31	0.03	-0.03	0.63	0.63	0.00	65	MC	3.33	0.05	-0.02	0.59	0.56	0.03
29	CR	1.20	0.06	-0.02	1.52	1.50	0.01	66	MC	-1.18	0.02	-0.05	0.49	0.50	-0.01
30	MC	0.03	0.03	-0.03	0.24	0.24	0.00	67	MC	0.27	0.03	-0.02	0.58	0.58	0.00
31	CR	-1.06	0.03	-0.03	1.23	1.23	0.00	68	MC	-1.19	0.03	-0.02	0.39	0.40	-0.01
32	MC	-1.09	0.02	-0.04	0.40	0.41	-0.01	69	CR	-3.74	0.01	-0.04	1.27	1.30	-0.03
33	MC	3.90	0.04	-0.02	0.82	0.79	0.03	70	MC	-0.77	0.03	-0.02	0.70	0.70	0.00
34	MC	1.36	0.04	-0.01	0.82	0.80	0.02	71	MC	1.32	0.03	-0.02	0.82	0.80	0.01
35	CR	-3.87	0.00	-0.05	1.39	1.44	-0.05	72	MC	2.72	0.03	-0.02	0.82	0.80	0.02
36	CR	0.36	0.03	-0.02	2.34	2.33	0.01	73	MC	-0.71	0.02	-0.02	0.76	0.76	-0.01
37	MC	-0.79	0.02	-0.02	0.86	0.87	-0.01	74	MC	-0.36	0.03	-0.03	0.54	0.54	-0.01
38	MC	-0.39	0.03	-0.02	0.32	0.32	-0.01	75	MC	0.55	0.03	-0.03	0.73	0.73	0.00
39	MC	3.11	0.04	-0.02	0.58	0.56	0.03								

Appendix B-28. Differential Item Functioning Analysis, Grade 8, Science, Hispanic (N=6,964)

Item	Type	Z	D+	D-	O	P	D	Item	Type	Z	D+	D-	O	P	D
1	MC	0.55	0.02	-0.03	0.40	0.40	0.00	40	MC	1.15	0.02	-0.02	0.48	0.47	0.01
2	MC	-0.09	0.01	-0.03	0.66	0.69	0.00	41	MC	-1.45	0.01	-0.03	0.42	0.43	-0.01
3	MC	1.36	0.01	-0.01	0.25	0.24	0.01	42	CR	-1.81	0.02	-0.02	1.29	1.30	-0.01
5	MC	-3.08	0.01	-0.02	0.66	0.68	-0.02	43	MC	0.28	0.01	-0.02	0.53	0.53	0.00
6	MC	3.31	0.02	0.00	0.64	0.63	0.02	44	MC	-1.23	0.02	-0.01	0.36	0.37	-0.01
7	MC	-0.22	0.01	-0.01	0.36	0.36	0.00	45	MC	-0.88	0.04	-0.05	0.55	0.56	-0.01
8	MC	-5.33	0.00	-0.03	0.72	0.75	-0.03	46	MC	-3.83	0.01	-0.03	0.53	0.55	-0.02
9	MC	-5.04	0.01	-0.03	0.69	0.71	-0.02	47	MC	1.83	0.02	-0.01	0.50	0.49	0.01
11	MC	-2.73	0.00	-0.02	0.54	0.56	-0.02	48	MC	-1.48	0.03	-0.02	0.39	0.39	-0.01
12	MC	4.54	0.03	0.00	0.64	0.61	0.02	49	MC	4.30	0.02	-0.01	0.88	0.86	0.02
13	MC	2.90	0.02	-0.01	0.58	0.57	0.02	50	MC	-1.44	0.02	-0.01	0.56	0.57	-0.01
14	MC	-3.35	0.03	-0.02	0.48	0.49	-0.02	51	MC	1.11	0.02	-0.01	0.40	0.40	0.01
15	MC	-6.63	0.01	-0.04	0.24	0.27	-0.03	52	MC	-0.78	0.03	-0.03	0.64	0.65	-0.01
16	MC	1.30	0.02	-0.01	0.43	0.42	0.01	53	CR	2.35	0.04	-0.03	2.06	2.04	0.02
17	MC	2.80	0.02	-0.01	0.78	0.77	0.02	54	MC	-3.38	0.01	-0.03	0.53	0.55	-0.02
18	MC	-2.60	0.02	-0.02	0.60	0.61	-0.02	55	MC	4.12	0.02	0.00	0.74	0.71	0.02
19	MC	-1.63	0.03	-0.02	0.44	0.45	-0.01	56	MC	2.35	0.01	-0.02	0.65	0.64	0.01
20	CR	-0.68	0.03	-0.05	1.96	1.96	0.00	57	MC	5.82	0.03	0.00	0.88	0.86	0.03
21	CR	0.11	0.03	-0.04	1.83	1.83	0.00	58	MC	-2.14	0.02	-0.02	0.34	0.35	-0.01
22	CR	0.97	0.05	-0.03	1.56	1.56	0.00	59	MC	0.45	0.02	-0.01	0.71	0.71	0.00
23	CR	4.03	0.07	-0.05	3.12	3.08	0.04	60	MC	1.09	0.03	-0.02	0.18	0.18	0.01
24	CR	2.44	0.10	-0.06	2.44	2.39	0.05	61	CR	1.67	0.03	-0.03	1.54	1.53	0.01
25	CR	1.53	0.05	-0.05	2.17	2.16	0.02	62	MC	2.49	0.02	-0.01	0.84	0.83	0.01
26	MC	3.55	0.03	-0.01	0.84	0.82	0.02	63	MC	2.34	0.02	-0.01	0.48	0.46	0.01
27	MC	2.78	0.03	-0.02	0.56	0.54	0.01	64	CR	-6.91	0.03	-0.07	1.94	2.00	-0.06
28	MC	0.04	0.02	-0.02	0.54	0.54	0.00	65	MC	2.83	0.02	0.00	0.58	0.57	0.01
29	CR	2.84	0.03	-0.01	1.53	1.51	0.02	66	MC	-0.84	0.02	-0.02	0.50	0.50	-0.01
30	MC	-1.05	0.02	-0.02	0.24	0.25	-0.01	67	MC	0.46	0.01	-0.02	0.59	0.58	0.00
31	CR	0.50	0.02	-0.02	1.24	1.23	0.00	68	MC	-1.31	0.02	-0.03	0.40	0.41	-0.01
32	MC	-5.85	0.00	-0.03	0.38	0.41	-0.03	69	CR	-0.44	0.03	-0.03	1.31	1.30	0.00
33	MC	-2.27	0.02	-0.02	0.79	0.79	-0.01	70	MC	0.73	0.02	-0.02	0.71	0.70	0.01
34	MC	-1.04	0.01	-0.01	0.80	0.80	0.00	71	MC	-0.29	0.01	-0.01	0.61	0.61	0.00
35	CR	-4.04	0.01	-0.03	1.42	1.45	-0.03	72	MC	5.72	0.03	0.00	0.83	0.80	0.03
36	CR	-6.04	0.03	-0.06	2.29	2.34	-0.05	73	MC	3.10	0.02	-0.02	0.78	0.76	0.02
37	MC	-2.50	0.01	-0.04	0.66	0.67	-0.02	74	MC	-0.79	0.02	-0.01	0.54	0.55	0.00
38	MC	-0.60	0.02	-0.02	0.32	0.32	0.00	75	MC	-0.31	0.03	-0.01	0.73	0.73	0.00
39	MC	1.30	0.01	-0.01	0.57	0.56	0.01								